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PROTAMINE ZINC INSULIN

CLINICAL APPLICATION

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NEW YORK

A remarkable step forward in insulin therapy was achieved by Hagedorn [1] when he discovered protamine insulin. The addition of zinc to protamine insulin was suggested by Scott and Fisher; [2] zinc further enhances the prolonged action of protamine insulin and renders the mixture stable for a period of at least six months. Protamine zinc insulin is the only protamine insulin combination obtainable today. Protamine zinc insulin in many cases lowers the blood sugar for much more than twenty-four hours,[3] while protamine insulin acts for only twelve to fourteen hours. Consequently the observations made with protamine insulin, splendid as they have been, are not applicable to the management of diabetes with protamine zinc insulin, and to a great extent new plans of treatment must be developed.

The diabetic cases observed have been derived mainly from three sources: First, a series of thirty-seven cases at Sea View Hospital. This is a large institution for the treatment of tuberculosis; in none of these cases was the tuberculosis severe enough to affect the diabetes appreciably. The advantage of this group was that they remained in the hospital continuously and could be controlled and checked for a period of months. (Such an extended interval for study has made Krarup's [4] monograph the most convincing of all the publications on protamine insulin.) Drs. Mark and Sackey watched these patients very carefully and made a large number of blood sugar determinations on them. Second, a series of ambulant diabetic patients who were systematically treated in the course of office practice. These cases afforded an opportunity to determine what can be accomplished in the use of protamine zinc insulin without hospitalization. Third, subjects who were seen casually; that is, for only a short period in hospitals, dispensaries or the office.

Drs. Carl H. Greene, Leonard F. Jourdonais, Morton F. Mark and M. S. Sackey, supplied data on and studied the cases observed in this article.

Read before the Section on Pharmacology and Therapeutics at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

1. Hagedorn, H. C.: Presentation at Nordisk Congress for Internal Medicine, Copenhagen, June 29, 1935. Hagedorn, H. C.; Jensen, B. N.; Krarup, N. B., and Wodstrup, I.: Protamine Insulinate, J. A. M. A. **106**: 177-180 (Jan. 18) 1936.
2. Scott, D. A., and Fisher, A. M.: Effect of Zinc Salts on Action of Insulin, J. Pharmacol. & Exper. Therap. **55**: 206 (Oct.) 1935.
3. Rabinowitch, I. M.; Foster, J. S.; Fowler, A. F., and Corcoran, A. C.: Clinical Experience with Protamine Zinc Insulin and Other Mixtures of Zinc and Insulin in Diabetes Mellitus, Canad. M. A. J. **35**: 239 (Sept.) 1936. Wilder, R. M.: The New Insulin, Minnesota Med. **20**: 6 (Jan.) 1937.
4. Krarup, N. B.: Clinical Investigations into the Action of Protamine Insulinate, Copenhagen, G. E. C. Gad, 1935.

PURPOSE OF PROTAMINE ZINC INSULIN

The lives of diabetic patients may be prolonged indefinitely with the use of regular, soluble insulin. The sacrifices that are made in the severe case are that as many as four hypodermics may be required during the day and that meals must be taken in proper relation to the injection. In other words, a person suffering with diabetes has all the privileges of a normal individual except with regard to meals and the use of insulin; to a certain extent, therefore, the diabetic patient must be on an exacting schedule throughout the day. The resort to protamine zinc insulin should do away with these restrictions; the ideal to be attained is that one dose of protamine zinc insulin is given in the morning before breakfast when the routine preparations for the day are carried out, and the meals are taken at optional hours with no anxiety about their being served exactly on time. Any deviation from this schedule does not fulfil the complete purpose of protamine zinc insulin. An effort was made to determine how protamine zinc insulin can be given most effectively and to establish, if possible, a functional pathologic conception which would serve as a guide for the use of protamine zinc insulin in the treatment of diabetes.

GUIDES FOR THE USE OF PROTAMINE ZINC INSULIN

The most satisfactory measure for the adequate effect of protamine zinc insulin is the blood sugar, which should be regulated so that excessive hyperglycemia and marked hypoglycemia are prevented. The variations permissible in indvidual patients differ a great deal, since the degree of hyperglycemia which oversteps the renal threshold, resulting in glycosuria, and the level to which the blood sugar can be depressed before hypoglycemic reactions appear are very far from fixed values. Phases of blood sugar which are of practical significance in the control of diabetes with protamine zinc insulin are:

1. Basic blood sugar level.
2. Paroxysmal hyperglycemia.
   (*a*) Postprandial.
   (*b*) Nerve tension.
   (*c*) Menstrual.
3. Paroxysmal hypoglycemia.
   (*a*) Exercise.

Changes from the normal of the basic blood sugar, i. e., the blood sugar while fasting, and the postprandial hyperglycemia exist in all but the mildest cases of diabetes. The other variations listed do not occur constantly and should be regarded as complications, which may or may not have to be considered. The deviation in the basic blood sugar and the postprandial hyperglycemia is not the same in all diabetic patients and that is probably why a uniform method of insulin admin-

istration and dietary prescription will never be applicable to all cases, and individual requirements must be conceded.

BASIC BLOOD SUGAR LEVELS

The blood sugar at the time of the morning fast may vary in three ways: It may be normal and remain so; it may be elevated and drop on further abstinence from food, or, as a third possibility, the fasting hyperglycemia may become more marked with prolonged starvation. A normal blood sugar on fasting is well known in patients with mild diabetes who are readily controlled by moderate dietary restrictions and require no insulin. The second and third group, with a high fasting blood sugar, and the subsequent course of the blood sugar are shown in chart 1. In the three lower curves the blood sugar dropped with fasting; these patients had never received insulin; they would have done very well on Allen's starvation regimen.

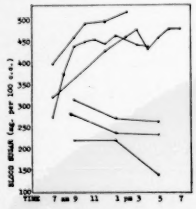

Chart 1.—Blood sugar curves, fasting, in three severe and three mild cases of diabetes: Three upper curves, severe diabetes, fasting, no insulin. Experiments could not be continued for twenty-four hours because of acidosis and threatened coma. Rise of blood sugar to a high level, which is constantly maintained. Early morning blood sugar comparatively low; regular insulin on previous day. (Experiment of Dr. Carl Greene.) Three lower curves, mild diabetes, fasting. The patients have never received insulin. Early morning blood sugar comparatively high. Drop of blood sugar with fasting. Contrast this with blood sugar in the severe cases in which insulin was given on the previous day.

The three upper curves depict a different course of events; these patients, observed by Dr. Carl Greene, had a persistent rise of blood sugar while starving and within a brief period the experiment could not be continued because of acidosis and threatened coma; these patients could not have been kept alive by any form of treatment except insulin. Lack of available insulin from the pancreas is probably the cause of the rise of blood sugar on fasting, and the same cause would bring about a postprandial hyperglycemia, so that the more severe the diabetes the higher the blood sugar both from endogenous (basic hyperglycemia) as well as from exogenous sugar (postprandial hyperglycemia). However, one point should be kept in mind: the basic hyperglycemia can be checked only by injections of insulin, while the postprandial hyperglycemia, besides being controlled by insulin, may be modified by diet.

POSTPRANDIAL HYPERGLYCEMIA

In advanced diabetes, after the ingestion of food, the blood sugar undoubtedly rises. An attempt was made to carry out a blood sugar curve in some of the severe cases, but it could not be completed because a marked acidosis developed and the use of insulin was urgently indicated. Blood sugar curves in diabetic patients who have never received insulin show that the postprandial blood sugar may rise, fall or remain unchanged (chart 2). These curves are derived from observations made before the discovery of insulin.[5]

The variations in the blood sugar after meals must depend on the amount of insulin secreted by the pancreas when stimulated by the absorption of food. It is interesting to note that at times there is an overresponse, and the blood sugar may even pass into the hypoglycemic range. It is apparent from this study that when the pancreas is still active the effect of meals on the blood sugar is almost unpredictable, and due caution must be exercised in administering protamine zinc insulin.

CONTROL OF BASIC AND POSTPRANDIAL HYPERGLYCEMIA WITH PROTAMINE ZINC INSULIN

Patients confined in a hospital are largely free from the influence of nerve tension and exercise on the blood sugar. Hence the thirty-seven cases observed at Sea View Hospital furnish an ideal material by which to judge of the control of the basic and postprandial hyperglycemia with protamine zinc insulin. It was found that the patients requiring smaller doses of protamine zinc insulin showed almost ideal control, while those having need for larger amounts were prone to have a basic hypoglycemia, noted from midnight to 6 a. m., and a postprandial hyperglycemia (chart 3). The same idea is expressed by the median blood sugar curves obtained from each group (chart 4).

The remedy for the lack of control when massive doses of protamine zinc insulin are required may be one of several: Either the protamine zinc insulin and the carbohydrate content of the diet are diminished, thus raising the basic blood sugar and lowering the postprandial hyperglycemia, or the carbohydrates are increased and distributed as evenly as possible throughout the twenty-four hour period; evening feedings, at about 11 p. m., of crackers and milk have been resorted to by many clinicians and have proved to be very helpful; the six meal schedule, with a high starch content advocated by Rabinowitch, is very efficacious, but such a regimen makes living an irksome task and that is the main point which it is desired to obviate in resorting to protamine zinc insulin. In some instances the situation has been remedied by administering regular insulin with protamine zinc insulin; here again, while control of the diabetes may be obtained, there is a deviation from the true purpose of the use of protamine zinc insulin because multiple injections of insulin add much to the complexity of living.

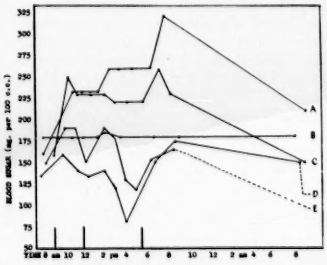

Chart 2.—Blood sugar curves in diabetic patients who have never received insulin: The diurnal blood sugar curves are not constant; the blood sugar may rise, fall or remain unchanged. *A*, progressive "staircase rise" after meals; *B*, unchanged by meals; *C*, rise after breakfast and supper; *D*, "paradoxical" drop after lunch; *E*, rise and recession after each meal.

PAROXYSMAL HYPERGLYCEMIA DUE TO NERVOUS TENSION

In some diabetic patients nerve tension results in frequent and marked hyperglycemia, so that alternations of glycosuria and hypoglycemic reactions occur.

5. Mosenthal, H. O.; Clausen, S. W., and Hiller, Alma: Effect of Diet on Blood Sugar in Diabetes Mellitus, Arch. Int. Med. **21**:93 (Jan.) 1918.

Such cases can be much better served, as a rule, by the use of regular insulin without protamine zinc insulin, or combined with small doses of protamine zinc insulin, so that a flexibility of insulin effect may be maintained to accommodate itself to the unpredictable variations in the blood sugar of high strung persons.

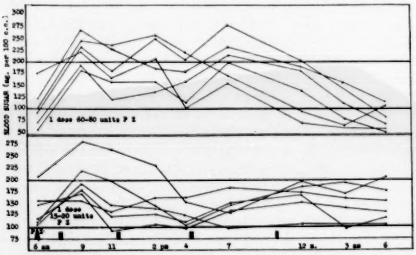

Chart 3.—Blood sugar curves (arterial blood) in diabetic patients receiving a large dose of protamine zinc insulin (upper curves) and a small dose of protamine zinc insulin (lower curves): With the larger dose hyperglycemia is prone to occur from midnight to 6 a. m. and hyperglcemia during the day; with the smaller dose such variations in the blood sugar are not found and the blood sugar is prone to remain within the normal range throughout the twenty-four hours.

PAROXYSMAL HYPERGLYCEMIA ASSOCIATED WITH MENSTRUATION

There may be marked paroxysmal hyperglycemia associated with menstruation.[6] It probably accounts for some of the transient glycosurias in female diabetic patients; care must be exercised that if such hyperglycemias are corrected by raising the protamine zinc insulin at the time of the menstrual period there is not subsequently an overdosage of insulin entailing hypoglycemic reactions.

PAROXYSMAL HYPOGLYCEMIA AFTER EXERCISE

Exercise increases the consumption of sugar in normal persons, in patients with mild diabetes or in patients with severe diabetes under the direct influence of insulin. However, "in the fasting patient with severe or moderately severe diabetes who has received no injection of insulin for several hours, the immediate result of exercise may be that of raising the blood sugar level."[7]

Exercise, therefore, brings about an augmented utilization of dextrose only when a reserve supply of insulin is available; if this supply does not exist, physical effort may result in an elevation of the blood sugar and glycosuria. Marble and Smith[7] believe that protamine zinc insulin, even when administered many hours before, should accomplish the digestion of sugar after exercise. Their theory has in my experience proved correct. The hypoglycemic reactions following physical effort in diabetic patients using protamine zinc insulin have been very marked. Substantial amounts of carbohydrate, such as bread and milk, taken before golf, tennis, baseball, walking and the like will usually suffice to control the blood sugar; however, in some patients the hypoglycemic reactions were so severe that protamine zinc insulin had to be abandoned and regular insulin substituted.

6. Harrop, G. A., and Mosenthal, H. O.: Influence of Menstruation on Acidosis in Diabetes Mellitus, Bull. Johns Hopkins Hosp. **29**: 161 (July) 1918.

7. Marble, Alexander, and Smith, Rachel M.: Exercise in Diabetes Mellitus, Arch. Int. Med. **58**: 577 (Oct.) 1936.

HYPOGLYCEMIC REACTIONS

Hypoglycemic reactions have been less frequent with protamine zinc insulin than with protamine insulin. It is probable that in attempting to control the diabetes by one injection of protamine insulin which lasted for only twelve hours there was a tendency to overdosage. The reactions do not occur as often with protamine zinc insulin as with regular insulin but are prone to be more severe and prolonged. As mentioned previously, the hypoglycemia after exercise and the attempt to correct the hyperglycemia of nervous tension and of menstruation by increasing the protamine zinc insulin are common causes of reactions. When regular insulin is given in conjunction with protamine zinc insulin, the effects of regular insulin on the blood sugar are much enhanced and hypoglycemia often results.

In all cases presenting hypoglycemic reactions while under careful hospital supervision it was noted that tremor and perspiration were much more frequent with regular than with protamine zinc insulin, that palpitation, irritability and blurred vision occurred with equal frequency, but that headache was much more often complained of while the subjects were under the influence of protamine zinc insulin. When a change was made from regular insulin to protamine zinc insulin in the office cases, a slight to moderate headache on waking in the morning was often complained of; this appears to be an indication of hypoglycemia in the early morning hours and should be corrected by late evening meals or by lowering the dose of insulin.

USE OF PROTAMINE ZINC INSULIN FOR HOSPITALIZED OR AMBULANT PATIENTS AND IN COMA

In my experience there never has been any difficulty in treating diabetic patients with protamine or protamine zinc insulin while ambulant. More frequent calls at the office will be necessary until the situation is controlled, after which matters usually proceed uneventfully in routine fashion as when regular insulin is used.

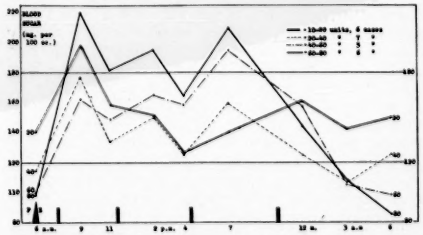

Chart 4.—Mean blood sugar curves (arterial blood) of twenty-four diabetic patients receiving one dose of protamine zinc insulin: The higher the dose of protamine zinc insulin the lower the blood sugar in the early morning and the higher the blood sugar during the day.

The hospitalized patients are often satisfactorily and readily adjusted, only to have the situation changed entirely on discharge, when the hyperglycemia of nerve tension and the hypoglycemia after exercise become factors in the daily life of the diabetic patient. There is much to be said for the idea that the most permanently satisfactory regimen, the quickest regulation and the greatest economy of time and expense are accomplished by office or dispensary management as compared to hospitalization.

Protamine zinc insulin may be given in diabetic coma without hesitation. I have used protamine insulin as well as protamine zinc insulin. After its administration the physician has to stand by to buffer the progressive hypoglycemia every hour or two, and the insulin treatment has been irrevocably established for a period of twenty-four hours. The use of regular insulin is obviously more flexible in handling emergencies in diabetic patients whose carbohydrate metabolism will change from hour to hour; a greater freedom of regulation is given with regular than with protamine zinc insulin. However, whether regular or protamine zinc insulin, or a combination of the two, is resorted to in handling the emergencies of diabetes is a matter of no great difference and may be taken up by each physician to meet his own conceptions of how the disturbed functions can most readily be returned to a normal state.

PROTAMINE ZINC INSULIN U-80

Thus far only protamine zinc insulin U-40 is available in the open market. It is obvious that U-80 is desirable, especially for those patients receiving more than 40 units at a single injection. Lilly, Mulford and Squibb have furnished some U-80 material for clinical trial. The protamine zinc insulin U-80 has been found to have the same effect, unit for unit, as the protamine zinc insulin U-40.

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DIFFICULTIES IN THE USE OF PROTAMINE ZINC INSULIN

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The advantages of protamine zinc insulin are so marked that one is loath to lay undue emphasis on difficulties in its use which have been great enough to lead a few patients to return to regular insulin. I have encountered thirty-eight of these and will now briefly describe them, because in general such a return was unnecessary. This is plainly evident because already eight of the thirty-eight have resumed protamine zinc insulin. The temporary omission of protamine zinc insulin was due in five cases to lack of knowledge of its use on the part of the patient, which resulted in reactions and in one case to lack of confidence in it because the preliminary period of instruction had been too short. Another patient gave it up because of a projective trip, quite rightly believing that on a journey long acquaintance with regular insulin would make its employment safer than protamine zinc insulin, with which she had slight experience. The final patient of this group had simply been given protamine zinc insulin in a series of test experiments for which he deliberately came into the hospital.

Experience in the treatment of patients with protamine insulin or, as now employed, protamine zinc insulin certainly does help in transferring patients on regular insulin to protamine zinc insulin. Thus before Oct. 1, 1936, 64 per cent of our patients taking protamine insulin alone or combined with calcium or zinc could be classified as showing either excellent or good results, whereas since October 1 the percentage has risen to 73. Confidence in the use of protamine zinc insulin on the part of the physician also is an important factor. Now we know from the statistical summaries made that our patients taking protamine zinc insulin or even combined regular and protamine zinc insulin do better than those on the former plan of treatment.

There is no gainsaying the fact that eight patients of the remaining thirty returned to regular insulin because they were convinced that the protamine insulin did not control the diabetes. Such a condition could have been avoided in two instances if the physician had not raised the carbohydrate in the diet during the transfer. These patients had been on a fairly low carbohydrate diet, and so seldom do we use so low carbohydrate values today that thoughtlessly we increased the same too much or too rapidly. The duration of the diabetes in one of these cases was eighteen years, and the other began in childhood and already was over twelve years. Three other persons who were living very useful and active lives and had survived diabetes by fifteen years did not get as good control of the disease with protamine zinc insulin as with regular insulin, even though they tried both protamine and protamine zinc insulin. They had been accustomed to regular insulin in two or three doses and in this manner could live so efficiently and with such freedom from glycosuria or reactions that they felt happier returning to the regular insulin even with its multiple doses. It is my personal belief that if these three patients cared to take the time to learn how to use regular and protamine zinc insulin together, because they undoubtedly would require combined doses, their diabetes would be far better controlled and they could live quite as efficiently. It is true that to do so it would be necessary that the old idea of changing the dosage of insulin from day to day would be replaced with the increase or decrease of diet to attain results. Two of these patients did not feel as well generally, and although they were not showing reactions I suspect that the fact that their blood sugar tests were on a much lower level than on which they had lived for years may have been a factor in this disability. Such patients should be changed to protamine zinc insulin very gradually. Furthermore, physicians and patients too should realize that protamine zinc insulin acts for such a long period that there is no use in altering doses daily, but one should be guided by the result of tests over a period of days.

It is true that with protamine zinc insulin occasionally one has a day of unexplained heavy glycosuria even though apparently conditions are identical. I myself do not believe that the conditions have been identical in such cases but rather that without recognition on the part of the patient more food may have been taken quite honestly; in the second place, less exercise in one form or another or more exercise may have been introduced. Then the insulin may not have been injected in quite the same manner. I grant that such days were not as commonly encountered with regular insulin, but there is no use denying the fact that protamine insulin may not be as uniformly absorbed as the regular insulin. I do not think that this irregularity often occurs, and I have less inclination to think so, because with U-80 protamine zinc insulin the results are quite equivalent to a dose obtained with U-40 insulin and such an action one would not expect if the protamine zinc insulin was absorbed very irregularly.

Habit plays a great factor and involuntarily an intelligent patient learns how to live after fifteen years

Read before the Section on Pharmacology and Therapeutics at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

of experience with diabetes. For one who suddenly takes up new methods, life cannot be expected to run as smooth a course.

Of this group of eight, one was notable because severe neurologic symptoms occurred following reaction with protamine zinc insulin. Whether these had any connection with the actual reactions I am in doubt, because this patient had had reactions before with regular insulin and they might have been related to these. Furthermore, it is very questionable in my mind whether the neurologic symptoms were not from some other cause. One neurologist interpreted them as multiple sclerosis and another considered that they were part of an organic lesion in the brain. At first we supposed that they were simply manifestations of neuritis so frequent in diabetes and that they had no connection with the reaction. When I last saw the patient a cerebral accident appealed to me most as the etiologic factor for the symptoms, and it is true that in a young man without other cause suspicion falls on the type of insulin which chanced to have been used. No similar instance has been encountered in the 1,250 and more patients taking protamine zinc insulin.

Consideration of the three patients who in the past habitually took liberties with their diet and adjusted their insulin for this purpose calls for a more careful discussion. They found it more difficult to follow such practices with protamine zinc insulin than with regular insulin, although I think they could have done so provided they had added a little regular insulin as a second dose later in the day. Thus Wilder with patients in coma and I with surgical patients and with patients with infectious diseases have used protamine zinc insulin as a basic treatment, and in addition regular insulin has supplemented it depending on the condition of the urine collected at intervals of from four to six hours. Before protamine zinc insulin came in we were accustomed to recommend the fraction according to the result of Benedict's test $\frac{\text{red}}{20}$ $\frac{\text{orange}}{15}$ $\frac{\text{yellow}}{10}$ $\frac{\text{green}}{5}$ $\frac{\text{blue}}{0}$ units at the respective intervals of four, six or eight hours. With the use of protamine zinc insulin the figures would drop approximately one half.

The five patients who gave up protamine zinc insulin permanently because of reactions were led to do this largely because of reactions developing during exercise. There is no doubt that with protamine zinc insulin carbohydrate is better utilized and there is less available for use during muscular exertion unless the supply is increased. The patients who are trained first with protamine zinc insulin learn this readily, but other patients who have been habituated to regular insulin have great difficulty in acquiring this knowledge and utilizing it as a routine technic during exercise. Diabetic patients today follow such active lives that I believe that, if there is any tendency in any given patient to a reaction, the patient must be brought up to take carbohydrate between meals and on retiring. It simply will not do for the diabetic patient to develop the reputation that he is liable to become unconscious or to have convulsions at any odd moments.

The type of reaction that the protamine zinc insulin patient endures is distinctly uncomfortable. The headache lasts a long time and is not promptly relieved with carbohydrate. The nausea may be very annoying. There are other reasons than protamine zinc insulin, however, for headache and for nausea and these must be sought before laying the blame on protamine zinc insulin. Nevertheless, it is a fact that the headache is depleting and that the nausea is dangerous because it confuses the diagnosis with appendicitis and diabetic coma.

The occupations of three patients were of so varied and changing types that today I would hesitate to recommend protamine zinc insulin as the chief basis for their treatment. These were well trained diabetic patients; they had had their disease for years, had worked and labored to secure these special occupations and to their precious jobs they had adjusted their entire lives; years of trial and error had been devoted to this object, and a week or two or even a month or two of trial with protamine zinc insulin could not equal what they had accomplished with years of use of regular insulin.

The remaining ten cases of the series in which protamine zinc insulin was given up can be placed in a miscellaneous group. Again here one encounters two instances in which the intelligence of the patient was not equal to the use of the combined regular and protamine zinc insulin, although with a milder type of diabetes the patients could have been brought up to live on protamine zinc insulin alone. There was another patient, a problem child, and still another with encephalitis and one with unusual edema of doubtful origin. The three patients had been confused because in the early days of protamine insulin we had been obliged to transfer from one preparation to another as new varieties appeared, and in two others we simply did not insist on a long enough period of treatment before discharging the patient.

A hospital stay is not always necessary for a diabetic patient who is to use protamine zinc insulin, but I do think that a hospital stay is very essential if one is to attempt to trade a patient who has lived for years successfully on regular insulin over to the combined regular plus protamine zinc insulin. These patients simply must see others going through the process so as to learn the mistakes that can occur. They think they know all about the management of their diabetes, and it is only by having them under observation, where they can watch others as well as themselves, that one can secure the best results. When I see Mrs. St. C., who for months was compelled to take nearly 500 units of regular insulin daily, now living comfortably on regular insulin 100 units and protamine zinc insulin 300 units, each given before breakfast, it makes me confident that any case needing far smaller quantities of insulin could be adjusted satisfactorily. The patient in question has gained from 87 pounds (39.5 Kg.) up to 111 pounds (50 Kg.). The cause of her insulin resistance need not be discussed here, because eventually a more extensive report will be made; but her case is cited as showing what one can do with protamine zinc insulin and as a hint that other cases far less severe, when the conditions are right, can be managed as well. The number of cases of considerable severity managed satisfactorily on combined regular and protamine zinc insulin almost daily reconvinces me how satisfactorily protamine zinc insulin can act. Furthermore, the fact that not one patient who has started his treatment with protamine zinc insulin has been changed to regular insulin in the course of twenty-two months is another argument for the efficiency of protamine zinc insulin. Patience, time and the will on the part of both patient and physician to secure the full benefit which protamine zinc insulin can confer in my opinion will surmount any temporary difficulties.

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CLINICAL EXPERIENCE WITH PROTAMINE ZINC INSULIN

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Regular insulin has been used in the treatment of diabetes for about a decade and a half. The great improvement that it brought about in the treatment of diabetes was apparent at once. Its limitations as a substitute for the normal, functioning islands of Langerhans were gradually becoming more apparent during the last half of this time. These limitations were rarely stressed, and probably rightly so, in medical literature until the recent introduction of protamine insulin. A number of reports on the therapeutic results obtained with protamine insulin and with protamine zinc insulin have appeared in the literature. These reports, by necessity, have been made on the basis of a limited number of patients treated over a limited period. The tenor of the reports has, in general, been favorable to the use of protamine insulin and protamine zinc insulin. At present there are insufficient data to warrant detailed statistical analyses of the results of treatment. Nevertheless, sufficient experience has been accumulated to warrant a more critical evaluation of results than was possible a year ago. The present paper will deal with some of the impressions which I have obtained from the use of protamine zinc insulin at the Mayo Clinic. These impressions may have to be revised when subjected to statistical scrutiny.

Our policy at the clinic has been to give one dose of protamine zinc insulin in the morning, before breakfast. When necessary, this is supplemented with a small dose of regular insulin given at the same time. In the more refractory cases an additional dose of regular insulin may have to be given before the evening meal. Most of the burden of keeping the urine sugar free is thus placed on the protamine zinc insulin. This has seemed to be the best method of using the protamine zinc insulin. To date, June 1937, at least 400 patients have been treated in this fashion.

The fact that diabetic patients differ in their response to treatment is frequently overlooked. The cause of this variability is not known. It may possibly indicate that there are different forms of the disease, different etiologic factors, or merely differences in the intensity of the disease. Irrespective of the cause, any judgment on the merits of therapeutic measures should take cognizance of the ease or difficulty with which different diabetic patients can be treated. Failure to realize that such differences exist accounts for many erroneous conclusions regarding therapeutic measures. The classification of patients given in the accompanying tabulation is helpful in anticipating troubles that may arise in treatment.

Occasionally it will be found difficult to classify certain adults on this basis because group I merges rather imperceptibly into group II. It should be emphasized that this classification is based on the age and habitus of the patient at the onset of the disease and not on the actual age of the patient or his habitus at the time of examination. For example, a diabetic patient may be actually 20 years old and still retain most of the characteristics of juvenile diabetes. Likewise, the patient may no longer be obese when first seen by the physician; nevertheless, he should be classified as having diabetes with obesity.

When patients are classified in this fashion generally it will be found that most of the members of the first group will have severe diabetes that is relatively refractory to treatment. In these cases the blood sugar is likely to be unstable, so that glycosuria is difficult to control and insulin reactions readily occur. On the contrary, members of the second group have, as a whole, relatively mild diabetes and fairly stable blood sugars.[1]

At the Mayo Clinic we have treated both groups of patients with protamine zinc insulin. Although, as has been said, insufficient time has elapsed since the introduction of protamine zinc insulin to warrant detailed statistical studies of results, early in our experience it became apparent that the best results were being obtained with members of the second group; namely, the senescent and senile diabetic patients. Fortunately, they greatly exceed in numerical importance the members of the first group. It is precisely these individuals (those of group II) whose disease was easy to control with regular insulin. Relatively small doses of protamine zinc insulin, given once daily to these patients, often suffice to maintain a persistently sugar-free urine.

Classification of Patients

Group I	1. Juvenile. 2. Adolescent and early adult. 3. Adult (to 45 years). (a) Asthenic.
Group II	1. Adult (to 45 years). (a) Obese. 2. Senescent and senile (45 years and older). (a) Asthenic. (b) Obese.

Very often supplementary administration of regular insulin is unnecessary and insulin reactions rarely occur. There is no doubt that the use of protamine zinc insulin constitutes almost ideal therapy for this group of patients as far as control of glycosuria and amount of inconvenience to the patient are concerned. How much protamine zinc insulin will do toward prevention of arterial complications remains to be seen.

Our results with patients of group I have not been so encouraging. In fairness, however, it must be said that on the whole results have been equal to, and probably superior to, the results obtained with regular insulin. In treatment of these patients we have been confronted with two major difficulties; namely, irregular control of the glycosuria and severe hypoglycemic reactions. While these patients are under treatment, an appreciable number of them sporadically excrete sugar in fairly large amounts. Sugar suddenly appears in the urine and disappears from it for no apparent reason, and, if sufficient protamine zinc insulin or regular insulin is given to get rid of it, hypoglycemic attacks may occur. Formerly, when these patients were treated with regular insulin, similar fluctuations occurred throughout a period of twenty-four hours. Now, with the use of protamine zinc insulin, the interval between fluctua-

From the Division of Medicine, the Mayo Clinic.

Read before the Section on Pharmacology and Therapeutics at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

1. Occasionally one finds patients in group I whose diabetes behaves like that of patients in group II, and conversely one will find patients in the second group whose diabetes is relatively difficult to control. In the latter instance it generally will be found that the apparent severity of the diabetes is the result of some complication, such as hemochromatosis, hyperthyroidism, or an obscure infection. The intensity of the initial glycosuria in the absence of such complications is no guide to the fundamental severity of the disease.

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tions has been spread out over a longer period of time. Thus, if the urine is tested four times daily a sugar-free urine will be found on several consecutive tests; then often sugar will reappear on one, two or even more examinations. If no change is made in the program, the sugar again may disappear as mysteriously as it appeared. The initial appearance of the sugar frequently is at night or before the evening meal, and it persists until the following morning. If such is the case, additional amounts of regular insulin may have to be taken before the evening meal. When this occurs there is often very little superiority of the protamine zinc insulin over the regular insulin (from the patient's point of view). In spite of the fact that these fluctuations in control do occur, many of the patients say that they feel better when taking the "new" insulin.

The question at once arises whether the irregularity of control is detrimental to the health of the patient. I am not in a position to express any final opinion on this point. It has been realized for a long time that prevention of the degenerative lesions, which are so prone to develop in patients who have diabetes, constitutes the major difficulty in the present day management of the disease. I cannot see that any material progress has been made as far as prophylactic treatment against this phase of the disease is concerned unless protamine zinc insulin, by virtue of its continuous action, should prove to be of some value in this regard. The cause of these degenerative lesions is not known in spite of the vast amount of investigation that has been done and the hypotheses that have been offered. Formidable objections can be raised against all the explanations that have been offered, whether or not they incriminate the blood sugar, the glycosuria, the acidosis, the constituents of the diet or any of the other known factors in the disease. The evidence that the hyperglycemia and the glycosuria, per se, are the etiologic factors in arteriosclerosis of diabetes is not at all convincing. Eventually, it may be proved that the sugar in the urine has nothing to do with the matter. There is evidence to suggest that it may hasten the arteriosclerotic processes which have been initiated by other causes. Nevertheless, simply because we cannot achieve a sugar-free urine with the use of protamine zinc insulin, we as physicians are not justified in abandoning our former position that a consistently sugar-free urine is the sine qua non in the treatment of diabetes. Eventually we may honestly be able to tell our patients that the sugar which appears in the urine when they are taking protamine zinc insulin does them no harm. Eventually we may point out to them that there is a difference between the urinary sugar that occurs when they are taking protamine zinc insulin and the sugar that appeared when they used to take the regular insulin, because while they are taking the new insulin there is always some functioning insulin in the body whereas when they were taking the old insulin there were often long periods in each twenty-four hours when their bodies were almost entirely without insulin. But are we justified in making such statements at present? I do not believe that we are.

In treatment of the same group of patients (those of group I), serious insulin reactions occurred when regular insulin was used. These patients were the tightrope walkers who had brittle blood sugars and who alternated between bouts of glycosuria and attacks of hypoglycemia. The use of protamine zinc insulin has mitigated this undesirable situation, but by no means has it been eliminated. Some of the insulin reactions following the use of protamine zinc insulin have been peculiarly malignant in that they have occurred at times when the patient could not possibly believe that his initial warning symptoms were hypoglycemic in origin, nor could the attending physician believe that the subsequent symptoms were due to the same cause. In a few instances, because of the prolonged action of the protamine zinc insulin, the hypoglycemic attacks have recurred in waves. Temporary relief followed recognition and treatment of the initial symptoms but the relief did not persist. The experience of one of our patients is particularly instructive:

> A man had been getting along well on 22 units of protamine zinc insulin taken in a single dose in the morning. January 22 he took a business trip in his automobile and, because he could not get his usual diet en route, he ate very little for his noon and evening meals. The following morning the urine was sugar free. He did not feel like eating all of his breakfast but he took his usual dose of protamine zinc insulin. About 9 o'clock he began to tremble and "shake like a leaf" and at the same time he was seized with a violent abdominal pain which was followed by nausea and vomiting. He was taken to a hospital in a neighboring town, where his condition was promptly recognized as an insulin reaction. The concentration of blood sugar was found to be 41 mg. for each hundred cubic centimeters. He was given orange juice and syrup. In about an hour he felt normal again. He took nothing further by mouth that day. About midnight he again experienced severe abdominal pain, nausea, vomiting and trembling. Several doses of orange juice at intervals of half an hour had to be given before he obtained relief. By noon the following day he again felt well and was able to eat his noon meal. On this day he took no insulin. January 25 his symptoms again recurred and the concentration of blood sugar was found to be 49 mg. for each hundred cubic centimeters. At this time he was given dextrose solution intravenously and 20 units of protamine zinc insulin. In two or three hours he felt normal again and the blood sugar was found to be 90 mg., but later in the day the symptoms again recurred. He does not remember whether he was given additional dextrose or what the intake of food was. At 4 a. m., January 26, his symptoms again returned and again he had to be given dextrose solution intravenously. He was then transferred to another hospital in a larger town. He had no further abdominal pain or vomiting. Roentgenologic examination disclosed the presence of gallstones.

The issues in this case are somewhat confused, and it is impossible to state what proportion of the trouble was due to the gallstones. There seems to be no doubt that the initial symptoms were hypoglycemic in origin, although it is possible that the later hypoglycemic episodes and abdominal pain were partly or wholly the result of disease of the biliary tract and hepatic dysfunction. Nevertheless, this case illustrates the treacherous character of hypoglycemic shock as it may occur following use of protamine zinc insulin. Bollman, who has been studying the effects of overdosage of protamine zinc insulin on experimental animals, says that nausea and vomiting occur regularly in dogs during the hypoglycemic periods.

It should be emphasized that hypoglycemia following administration of either protamine zinc insulin or regular insulin may be entirely without symptoms. Thus, one of our diabetic patients, during his convalescence from a surgical procedure, was accidentally found to have concentrations of blood sugar which varied from 28 to 42 mg. for each hundred cubic centimeters. This patient, lying quietly in bed, said that he felt fine, and the blood sugar was determined only because the urine had been persistently sugar free for several consecutive days. It is quite possible that this patient would have

had a severe hypoglycemic reaction had he been ambulatory. It is not wise to dismiss from observation diabetic patients who have been taking protamine zinc insulin if the urine contains no sugar unless the range of the blood sugar is determined.

Before the subject of hypoglycemia is dismissed, attention should be called to the fact that there is clinical and experimental evidence to suggest that severe

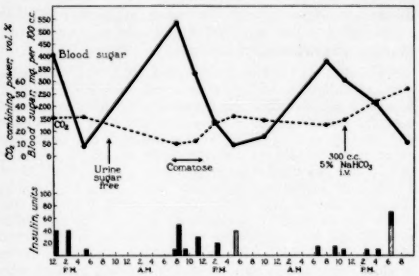

Chart 1.—Details of management of a case of diabetic acidosis in which no protamine zinc insulin was used at the beginning of treatment. Note that, in spite of a low blood sugar and a sugar-free urine six hours after admission, there was a complete "escape from control" during the following night. Solid black columns, regular insulin; diagonal striped columns, protamine zinc insulin.

hypoglycemic attacks may produce permanent pathologic changes in the central nervous system. In this connection it is significant that one of our patients who was subject to recurring insulin reactions while taking protamine zinc insulin was returned to the hospital because of the appearance of defects of memory.

It should not be inferred from what has been said that protamine zinc insulin is not equal to, or that in many instances it is not superior to, regular insulin in the management of severe diabetes. Most of the difficulties that have just been mentioned existed in one form or another with regular insulin; however, in many instances, except for the convenience of a reduced number of injections and the hypothetical protection offered against development of degenerative lesions, I cannot see that the use of protamine zinc insulin has altered the fundamental problems in connection with the management of severe diabetes. In such cases it has not simplified treatment nor has it by any means eliminated all the problems in management. In fact, I find that it is harder to treat some patients who have severe diabetes with protamine zinc insulin than with regular insulin if a persistently sugar-free urine is to be attained. In spite of the difficulties in management that are encountered in the treatment of severe diabetes, many patients, as mentioned before, say that they feel better taking protamine zinc insulin than they did while taking regular insulin. This is by no means always the case. In fact, two of our student dietitians who have severe diabetes asked to be returned to the use of regular insulin. Both of these young women have difficulty in avoiding disabling insulin reactions if the urine is kept anywhere near sugar free. A letter from a former patient summarizes the difficulties that may occur in the management of very severe cases:

The main purpose of this letter is to tell you I tried the new insulin at Christmas time under Doctor ——'s care. I stayed with him for nearly six weeks, spending ten days in the hospital trying it out. But we had very poor results. I seemed to get in rather bad shape, lost 20 pounds, and found it upset my whole system. We tried it one, two and three doses a day, alone and in combination with the old insulin but I never came clear for the whole six weeks for any length of time and yet had very severe reactions when it would take three and four hours to bring me out of them. After these reactions I would vomit and altogether it was a most unsatisfactory affair. And so I guess I'm still running true to form. Both Doctor —— and I were disappointed because we felt, since you advised the use of it for me, it would be of help to me. My father uses 15 units of it in the morning and it certainly works marvelously for him.

It could be argued that in this case the physician had not had the opportunity to develop the same expertness in the use of protamine zinc insulin which he had acquired in the use of regular insulin, and that possibly with a longer trial and more finesse in treatment a satisfactory program which included protamine zinc insulin could have been evolved. Nevertheless, this case, admittedly exceptional, does illustrate the difficulties that may be encountered in the treatment of severe diabetes with protamine zinc insulin.

In the preoperative and postoperative treatment of diabetic patients who have surgical complications and in the treatment of diabetic acidosis, protamine zinc insulin has proved to be of value. Situations not infrequently arise in which, although the immediate use of insulin will be contraindicated, the status of the patient will be such that several hours later the immediate use of insulin will be imperative. For example, the urine of one of our surgical patients who had severe diabetes was sugar free at 10 p. m. Six hours later well marked diabetic acidosis had developed. In situations of this kind protamine zinc insulin can be used to marked advantage. For example, diabetic patients prior to an operation may have a normal concentration of blood sugar so that one would hesitate to give a dose of regu-

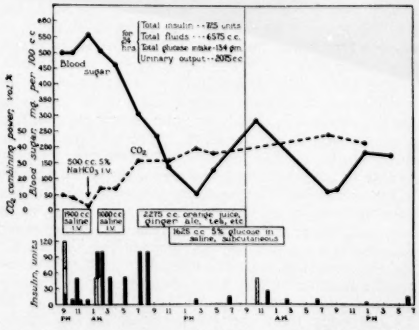
Total insulin—25 units
Total fluids—6575 c.c.
Total glucose intake-134 gm.
Urinary output—2055 cc
Blood sugar
CO2
500 c.c. 5% NaHCO3 I.V.
1000 c.c. saline I.V.
1000 c.c. saline I.V.
2275 c.c. orange juice, ginger ale, tea, etc
1625 c.c. 5% glucose in saline, subcutaneous
CO2 combining power, vol. %
Blood sugar, mg. per 100 c.c.
Insulin, units

Chart 2.—Details of management of a case of diabetic acidosis in which 50 units of protamine zinc insulin was injected at the beginning of treatment. Although only 25 units of regular insulin was used during the second twelve hours after admission, there was no "escape from control" in this period. Solid black columns, regular insulin; stippled columns, regular insulin intravenously; diagonally striped columns, protamine zinc insulin.

lar insulin. Several hours later the need for insulin may be urgent. Protamine zinc insulin can be given with comparative safety prior to the operation, for by the time the protamine zinc insulin begins to work the need for it will have arisen. The policy at the Mayo Clinic at present is to give from one half to two thirds

of the usual dose of protamine zinc insulin on the morning of the operation. If the patient has been taking regular insulin as well, the regular insulin is omitted or the dosage is greatly reduced. Any glycosuria that may appear after the operation is treated with regular insulin. The daily use of protamine zinc insulin supplemented, if necessary, with regular insulin is continued throughout the postoperative period until the patient is back on his usual diet and dosage of insulin. When this program is followed, there is very little danger that the disease will get out of hand during the immediate postoperative period, although, following tonsillectomy in two of our cases of severe diabetes in which treatment was with the foregoing preoperative and postoperative program, severe acidosis and incipient coma developed.

For some time after the introduction of protamine zinc insulin it was felt that its use was contraindicated in the treatment of diabetic acidosis and coma. Further experience has shown that it can be used to advantage in these conditions. Our present policy at the Mayo Clinic is to give all such patients a large dose of protamine zinc insulin and then to proceed with treatment as though no insulin had been given. Very often, in the treatment of diabetic acidosis and coma, there comes a period when it is exceedingly difficult to decide how vigorously further treatment should be pursued. The patient has made a satisfactory response to the treatment that has been given and for the moment further insulin may not be necessary, yet the patient is still in a delicately balanced condition and the need for insulin is certain to arise in the near future. If further insulin is not given, the consequences may be serious. It occurred to us that, because of its prolonged and rather gentle action, protamine zinc insulin would be useful in tiding the patient over this period of indecision. Charts 1 and 2 [2] illustrate the advantages of protamine zinc insulin in such situations. It is inadvisable to rely entirely on protamine zinc insulin in the treatment of diabetic coma. Frequently in this complication of diabetes every moment counts and the quicker the metabolic disturbance is controlled the better is the chance for recovery.

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SUMMARY

Protamine zinc insulin has facilitated treatment in many cases of diabetes, especially those in which the disease was of moderate severity. In this group of cases the disease usually responds satisfactorily to regular insulin. Earlier and more severe cases of diabetes, in which the blood sugar is unstable, are still a problem in treatment. In these cases nocturnal glycosuria can be eliminated with protamine zinc insulin, but control of the diurnal glycosuria is still very difficult to achieve if violent hypoglycemic episodes are to be avoided. Many of these patients feel better while taking protamine zinc insulin than they did while taking regular insulin, even though glycosuria is present during the day. Is such glycosuria detrimental to health? Until the cause of arteriosclerosis and the allied degenerative lesions which occur in diabetic patients has been determined beyond any reasonable doubt, we are not justified in assuming that such glycosuria is not detrimental to health.

Protamine zinc insulin also has proved to be of value as an adjunct in the treatment of diabetic acidosis and coma and in the preoperative and postoperative management of diabetic patients who have surgical diseases.

2. Reports of these two cases are given in detail in the Proceedings of the Staff Meetings of the Mayo Clinic **12**: 171-176 (March 17) 1937.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. MOSENTHAL, JOSLIN AND KEPLER

DR. WALTER R. CAMPBELL, Toronto: It is appropriate here to pay our tribute to pure biochemistry. First prepared by Miescher in 1874, intensively studied by Kossel about the turn of the century, the protamines could scarcely be regarded as of any clinical importance until Hagedorn utilized their property of combining with the higher proteins to prolong the action of insulin. The relationship of another constituent of the pancreas, zinc, to insulin has been the subject of study by Scott and his co-workers. Scott has shown that zinc is one of the necessary constituents of insulin crystals, that it increases the effectiveness of insulin and that the relative effectiveness of protamine insulin is dependent in large degree on the presence of adequate amounts of zinc. In addition, he has shown that certain basic amines, histones and several other substances, in combination with zinc, will enhance the effectiveness of insulin. Failure to appreciate the fact that the chemical and physical properties of the insulin determine its physiologic efficiency has been the chief cause of relative inefficiency in treatment with the newer insulins. With time, by persistent trial and adequate study, a solution can be found for every case of diabetes. In difficult cases it is clear that the best solution is not unmodified insulin alone. Neither can one stretch the properties of protamine zinc insulin to cover all cases, even when it is supplemented by all the dietetic tricks at one's command. There is a use for the properties of unmodified insulin, for zinc insulin, for protamine insulin, and for protamine zinc insulin. These are all specialist insulins. Today a general practitioner insulin is needed to cover even more adequately the requirements of the majority of patients with diabetes—one combining in suitable proportions the useful properties of the two varieties that now represent the extremes. Ambulant patients can be well treated with protamine zinc insulin. Because of added factors, such as work, hospital patients must often have readjustment of dosage after discharge. Younger patients frequently require combinations of protamine zinc insulin and regular insulin. The expenditure of protamine zinc insulin is dependent on the diet used. The lower the carbohydrate in the diet, the greater the economy observed. Emergencies are best treated with the unmodified insulin. Failure of the circulation is the danger of waiting too long for protamine zinc insulin to act. Dr. Kepler has rightly stressed the fact that treatment is not simplified by the introduction of the new insulins. Both patient and doctor must know more, but the judicious application of what they know materially improves the patient's condition and prospects.

DR. CARL H. GREENE, New York: I think it is agreed that the average diabetic patient, particularly if his case is severe, has welcomed the new product because it greatly simplifies the control of his disease. The physician, however, finds that the treatment of diabetes, as contrasted with control of the individual patient, has been complicated by the introduction of another variable to an already complicated equation. Generalizations are dangerous and I appreciate the fallacies inherent therein. One may sum up the situation, however, by saying that on the one hand mild diabetes with a low fasting blood sugar may be controlled by regulation of the diet and administration of sufficient regular insulin to prevent postprandial hyperglycemia. Severe diabetes, on the other hand, with elevated fasting blood sugar, is to be controlled by the administration of sufficient protamine zinc insulin to maintain the blood sugar at a normal or slightly subnormal level, while the diet is adjusted to prevent the development of a hypoglycemia. Protamine zinc insulin is most satisfactory in that it permits the handling of the average patient as an ambulatory or office patient rather than one who must be hospitalized. Because of the possibility of making observations and adjustments at short intervals, the patient in acute coma is best treated with regular insulin; but when it has not been possible to make observations at short intervals protamine zinc insulin should be used in addition to the regular insulin in the treatment of coma. Likewise in the management of infections, pregnancy and labor, and in operations, protamine zinc insulin has made it possible to carry the patients along without the necessity for frequent or hourly observation to prevent the development of

coma. The question of time of dosage depends somewhat on the character of the patient. An individual who is unable to space his meals through the day or likes the old-fashioned heavy breakfast seems to get better results when taking protamine zinc insulin before going to bed at night, rather than the first thing in the morning. Many patients are not satisfactorily controlled on protamine zinc insulin alone; but giving protamine zinc insulin in the morning, making supper the major meal of the day and the giving of a small amount of regular insulin at that time suffice for control. While the care of the individual patient is simplified, the possibilities of protamine zinc insulin further emphasize the importance of individualization and intensive care and study in the adjustment of the physical and dietary regimen and the kind and dosage of insulin to the needs of the particular patient.

DR. ABRAHAM RUDY, Boston: I would like to mention a case similar to Dr. Carl Greene's. A physician aged 47 has been doing well on about 40 units of regular insulin divided into two doses. When this was gradually changed to the same amount of protamine zinc insulin given once a day without any change in his diet he continued to do well for about two months. Without any apparent cause, his carbohydrate tolerance began to drop. A marked increase in the protamine zinc insulin was not sufficient to control his condition and it was necessary to add regular insulin. In spite of the fact that he was already taking 56 units of protamine zinc insulin with 24 units of regular insulin in the morning, 20 units of regular insulin before lunch and 12 units before supper, he continued to feel poorly and was losing weight steadily. He then insisted that I should change him back to the regular insulin alone. As soon as the protamine zinc insulin was omitted he immediately began to show improvement. The glycosuria and hyperglycemia cleared up in a few days. He was soon taking only 16, 16 and 12 units of regular insulin daily on the same diet, gained about 5 pounds (2.3 Kg.) and was doing well. A point of interest is that this patient has developed nodules at the site of the injections of the protamine zinc insulin. He counted as many as sixteen nodules in one day. These cleared up very slowly. With the change of the U-40 protamine zinc insulin to U-80, the nodules were smaller but the action of the insulin was the same. I also find nausea and vomiting fairly frequent as a sign of reactions from protamine zinc insulin. This is quite disturbing in the treatment. Otherwise the results with protamine zinc insulin are excellent in most cases.

DR. HERMAN O. MOSENTHAL, New York: One point I might add is with regard to the local reactions that some patients have with protamine zinc insulin and regular insulin. In one case these reactions were quite severe. Finally, after many trials, I remedied the situation by using a five-eighths to six-eighths inch needle instead of the usual three-eighths inch one and injecting the material as deeply as possible. The protamine zinc insulin under those circumstances was just as effective as though given subcutaneously.

DR. ELLIOTT P. JOSLIN, Boston: To begin ambulatory patients with protamine zinc insulin is a snap, but to change patients, especially if ambulatory, who have long been accustomed to regular insulin over to protamine zinc insulin is serious. In general it is better to send them to the hospital. If you have tried to change over such a patient, who has been on regular insulin, your reputation is apt to suffer, if it is done outside of a hospital. In the first place, you must have that patient under your control and his family and his wife and his relatives, because if you make a failure, about how many people will there be in your town who won't know it? The next rule is this: Always, before changing over a patient who has been taking regular insulin to protamine zinc insulin, have a period of at least three days' preliminary observation. That is most desirable in order to have a period for comparison. Finally, never urge protamine zinc insulin on a patient. Wait for him to ask for it and then say "It is a privilege to take protamine zinc insulin. If you wish I will help you to learn whether it will act better than regular insulin in your case." How long should a patient persist taking protamine zinc insulin before returning to regular insulin? A two months test is a liberal allowance, provided you actually know what your patient is eating and doing and furthermore have reliable laboratory data. In a letter from Dr. Himsworth from London I learned that he had obtained very good results indeed by giving protamine zinc insulin at 11 o'clock at night. I haven't tried that, but it is something to be considered. In other words, we do not have the last word yet about the way to give protamine zinc insulin.

THE PROBLEM OF SERORESISTANT SYPHILIS

(SO-CALLED WASSERMANN FASTNESS)

JOSEPH EARLE MOORE, M.D.
AND
PAUL PADGET, M.D.
BALTIMORE

Few things in syphilotherapy are more disconcerting, both to physician and to patient, than the persistence of a positive serologic reaction after the administration of an amount of treatment which to the former was recommended as adequate and which to the latter has seemed of interminable length and the source of immeasurable inconvenience and expense. The physician confronted with this situation may doubt the validity of the dicta of experts which he has been following and begin to tinker with different schemes of treatment or even with untried therapeutic agents; the patient, deprived of this much emphasized and to him always tangible evidence of improvement, may become discouraged and abandon treatment or fall into the hands of quacks. For these reasons an examination of the subject of seroresistant syphilis seems more than justified.

There is no generally accepted definition of seroresistance (so-called Wassermann fastness), but most observers agree that the concept should be based on an arbitrarily chosen span of time or amount of treatment and that a distinction should be drawn between patients with early syphilis and those late in the course of the disease. Accordingly, in this discussion, patients with early syphilis (i. e., infection of less than two years' duration) are considered to be seroresistant if the result of the serologic test for syphilis remains positive after six months of continuous treatment, whereas those who present themselves late (i. e., after having been infected with syphilis for more than two years) are considered to manifest seroresistance only if the result of the reaction to the serologic test for syphilis is positive after the equivalent of a year of treatment.

Numerous problems are presented by the patient with seroresistant syphilis, but they can be summarized in three large questions:[1]

1. What is the genesis of seroresistance?
2. What is the significance of seroresistance to the patient?
3. What is to be done about it?

GENESIS OF SERORESISTANCE

It is axiomatic that the number of positive results obtained from serologic tests on a large number of patients with syphilis is a direct measure of the sensitivity of the test employed. The influence of this

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Read before the Section on Dermatology at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 10, 1937.

1. No consideration is here given to the persistence of serologic abnormalities in the cerebrospinal fluid. That is a separate problem.

factor in the production of seroresistance is well illustrated in chart 1, in which it is shown that of 100 patients who manifested seroresistance as measured by the best tests of today, only seventy would have done so as judged by the best test of 1920 and only twenty-eight would have given a positive reaction with von Wassermann's original technic.

The fundamental biologic aspects of the disease also operate. In this connection the following questions are important: Does seroresistance indicate persistent foci of spirochetes or progressive syphilitic lesions? or Is the persistence of reagin in the circulating blood following antisyphilitic therapy simply a manifestation of persistent immunity?

No certain answer to these questions is possible because of lack of definitive evidence, either clinical or experimental, but available information indicates that while either or both factors may operate in the individual case, a few generalizations are possible. Here, as elsewhere, it is necessary to differentiate between early and late syphilis. In the interest of the patient, seroresistance in cases of early syphilis must, on the basis of present knowledge, be regarded as a manifestation of persistent foci of organisms or progressive activity. In cases of late syphilis, on the contrary, seroresistance may result entirely from the persistence of well established immunity.

A little emphasized point is the influence of the type of syphilitic infection at the beginning of treatment on the development of seroresistance. This is illustrated in chart 2, in which it is shown that in the various groups the incidence of seroresistance varies from

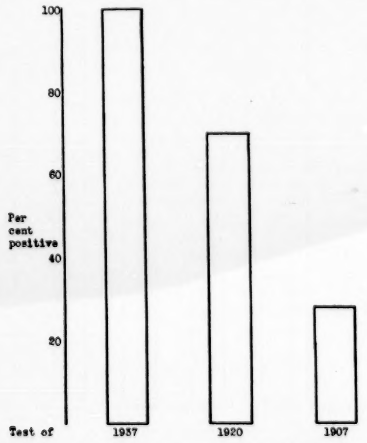

Chart 1.—The influence of the type of serologic test employed on the incidence of seroresistance. (Based on data from Eagle, Harry: The Laboratory Diagnosis of Syphilis, St. Louis, C. V. Mosby Company, 1937.)

about 10 per cent in patients with early syphilis to approximately 75 per cent in those who first come under treatment with dementia paralytica.

In cases of early syphilis, two other factors are of extreme importance in determining the incidence of seroresistance; first, the system of treatment employed, and second, the presence or absence of involvement of the neuraxis. The influence of the former is shown in chart 3; only 11 per cent of patients who receive continuous treatment are seroresistant, but 37 per cent of those treated intermittently and 68 per cent of those whose therapy is irregular give positive reactions to serologic tests more than six months after the institution of treatment.

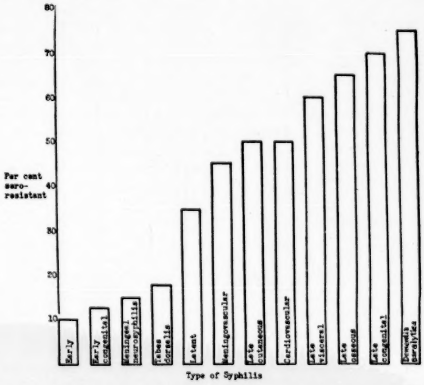

Chart 2.—Influence of the type of syphilis at the time treatment was begun on the incidence of serologic resistance. All groups of patients were well treated. (From data of the Cooperative Clinical Group.)

The relationship between the presence or absence of involvement of the neuraxis and the development of seroresistance is equally striking (chart 4). The influence of all other factors being disregarded, seroresistance is encountered in only a sixth of the patients whose cerebrospinal fluid is normal or falls into group I *a* [2] but occurs in almost a fourth of those whose cerebrospinal fluid is of group I *b* and in almost half of those manifesting changes typical of group II or group III.

In patients with late syphilis, however, the situation is entirely different. As shown in chart 2, seroresistance is a usual or expected eventuality with many forms of late syphilis. Studies from the Medical Clinic of the Johns Hopkins Hospital [3] and material from the Cooperative Clinical Group [4] have shown that the incidence of seroresistance is not influenced by the scheme of treatment employed or related to the existence of involvement of the neuraxis per se. Instead it may be viewed as an integral part of the manifestations of many late forms of the disease.

It is to be emphasized that the foregoing data concern patients who receive adequate antisyphilitic therapy or if their treatment is irregular or intermittent receive adequate doses when treatment is given. There is no information which allows a clear evaluation of the

2. The usual classification of changes in the cerebrospinal fluid is employed: group I*a*, 6 cells or more, all other observations normal; group I*b*, 5 cells or more, protein increased, no other abnormalities; group II, reaction to complement fixation or other standard serologic test for syphilis positive with larger amounts of fluid (from 0.4 to 1 cc.) the results of other examinations variable; group III (the paretic formula), reaction to complement fixation or other standard test positive with 0.1 cc. or less of cerebrospinal fluid, a paretic colloidal curve.

3. Wasserman, Harry, and Goodman, Morton J.: The Results of Treatment in Late Mucocutaneous and Osseous (Benign Late) Syphilis, Am. J. Syph. & Neurol. **18**: 458 (Oct.) 1934. Smith, F. R., Jr.: Late Congenital Syphilis, Bull. Johns Hopkins Hosp. **53**: 231 (Nov.) 1933.

4. Moore, J. E.; Cole, H. N.; O'Leary, P. A.; Stokes, J. H.; Wile, U. J.; Clark, Tahiaferro; Parran, Thomas, Jr., and Usilton, Lida J.: Cooperative Clinical Studies in the Treatment of Syphilis: The Treatment of Latent Syphilis: III. Clinical Progression and Relapse, Wassermann Fastness, and Death, Ven. Dis. Inform. **13**: 389 (Nov. 20) 1932.

effect of treatment with inadequate doses of drug on the course of either early or late syphilis. From theoretical considerations and from deductions based on clinical observation, however, it seems probable that inadequate doses, even given according to a system of continuous treatment, are a potent factor in the production of seroresistance.

Chart 3.—Relationship between the system of treatment employed and the incidence of seroresistance in patients with early syphilis. (From data of the Cooperative Clinical Group.)

SIGNIFICANCE OF SERORESISTANCE

The all important question both to the physician and to the patient is "What is the significance of seroresistance?" Here again early and late syphilis must be considered separately.

The relationship between seroresistance and the presence or development of the two most important failures of treatment in cases of early syphilis is shown in chart 5. All patients considered had received adequate antisyphilitic therapy. Twenty-three per cent of the seroresistant group, but only 5 per cent of the patients who manifested prompt serologic reversal, sustained infectious relapse; similarly, neurosyphilis occurred in 31 per cent of the former but in only 18 per cent of the latter.

The contrasting situation which obtains in patients with late syphilis is shown in chart 6. For each type of late syphilis considered, the incidence of progression or relapse is essentially the same among patients who are seroresistant as among those who are not; indeed, in the case of latent or benign late syphilis, relapse occurs somewhat more frequently in patients who are not seroresistant than in those who are. Progression or relapse developed in 4.6 per cent of the patients with latent syphilis who were seroresistant and in 5.7 per cent of those who were not; in the case of benign late syphilis one of these eventualities developed in 9.8 per cent of the seroresistant group and in 12.2 per cent of the patients who had experienced serologic reversal. In the group with late congenital syphilis, 21.5 per cent of the patients who were seroresistant and 20 per cent of those who were not later manifested progression of the disease. In patients with these types of late syphilis, therefore, seroresistance may actually be beneficial rather than harmful.

In patients with other forms of late syphilis, especially cardiovascular syphilis or neurosyphilis, seroresistance is so common that the impossibility of placing special interpretation on its occurrence is readily apparent.

MANAGEMENT OF SERORESISTANT SYPHILIS

The preceding discussion has merely provided a background of necessary information for an intelligent consideration of the crux of the entire problem "What is to be done for the patient who manifests seroresistance?"

Before answering this question in detail, it is essential to reemphasize the aims of the treatment of syphilis, early or late. These are (1) the healing of lesions and the relief of symptoms, (2) the maintenance of good health and the prevention of progression or relapse and (3) least important, serologic reversal. Obviously, if the first and second aims can be accomplished, success or failure in the third is, or should be, a matter of complete indifference to physician and patient alike. If the patient can be restored to health and kept so for a lifetime, seroresistance may be regarded as entirely analogous to the persistence of a positive reaction to the tuberculin test in a patient recovered from tuberculosis or a positive reaction to the Widal test in one recovered from typhoid fever. Efforts to abolish a persistently positive reaction to the tuberculin test or a positive reaction to the Widal test are agreed to be both unnecessary and futile.

It is easy to tell when the first aim of treatment, the healing of lesions and the relief of symptoms, is accomplished. In most patients this can be done within a few days or weeks and is not necessarily accompanied by any change in the serologic test. How can one tell when

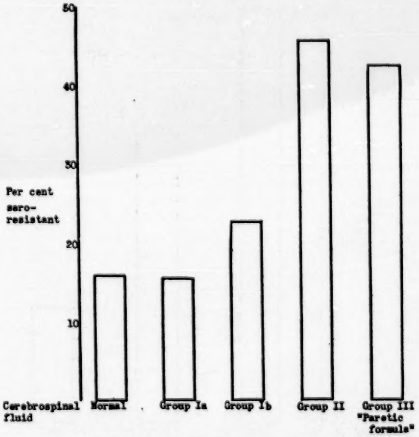

Chart 4.—Relationship between the changes in the cerebrospinal fluid and the incidence of seroresistance in patients with early syphilis irrespective of the type and amount of treatment. (From data of the Cooperative Clinical Group.)

the second aim, the maintenance of good health and the maximum possible freedom from progression or relapse, has been obtained? Can this be measured by serologic reversal or serologic fastness? In patients with early syphilis, probably yes; and here serologic control of treatment is desirable, serologic reversal to be sought and seroresistance to be feared. In patients with late syphilis, certainly no. The patient's ultimate

clinical fate cannot be measured in any degree by what happens to his blood test. The only possible criterion for determination of the optimum kind, amount and duration of treatment is the long term clinical observation of large series of similar patients given varying kinds and amounts of treatment for varying periods of time. Such observation indicates, as has been

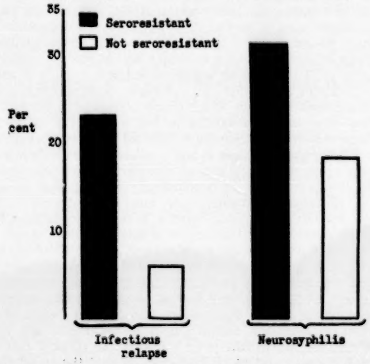

Chart 5.—Relationship between seroresistance and failure of treatment in patients with early syphilis.

pointed out, that the seroresistant patient, adequately treated, does as well as, or even better than, his supposedly more fortunate brother with serologic reversal. Considered in this light, the serologic control (so far as blood tests are concerned [5]) of treatment in cases of late syphilis is unnecessary, even undesirable, and seroresistance loses its fearsome significance.

The Management of Seroresistant Syphilis

In Patients with Early Syphilis

I. Examine the cerebrospinal fluid
   A. If reaction is positive: Alter system of treatment to that for early asymptomatic neurosyphilis
   B. If reaction is negative:
      1. Eliminate rest periods—treatment must be continuous
      2. Employ full dosage of a potent arsphenamine
      3. Prolong treatment for a full year of weekly injections after serologic reversal is obtained

In Patients with Late Syphilis

I. Examine the cerebrospinal fluid

II. Conduct a searching clinical study for lesions of syphilis, with particular reference to:
   A. The cardiovascular system (including roentgenologic examination)
   B. The central nervous system
   C. The bones

III. If abnormalities in any of these systems are discovered, plan treatment accordingly

IV. If no abnormalities are discovered:
   A. Prolong treatment to a minimum of two years, continuously and with full doses
   B. Follow the patient for the rest of his life, with, periodically, complete and searching resurveys of his clinical status.
   C. Frankly discuss and fully explain the situation to the patient and give him as much reassurance as possible

In the accompanying table are summarized the steps which must be taken in the treatment of seroresistant patients with early or late syphilis.

In patients with early syphilis the high correlation between seroresistance and involvement of the neuraxis makes it imperative immediately to examine the cerebrospinal fluid of every seroresistant patient or to reinvestigate it if the results of a previous examination were normal. If the cerebrospinal fluid is normal, further continuous intensive treatment will result in serologic reversal almost uniformly within a year, and the same system of treatment should be continued for a full year after serologic reversal has occurred.

In patients with late syphilis the ever present necessity for examination of the cerebrospinal fluid and repeated diligent clinical and roentgenologic search for lesions of syphilis, especially in the cardiovascular, skeletal and central nervous systems, is made even more urgent by the manifestation of seroresistance. If lesions caused by syphilis are found, the system of treatment is, of course, to be planned accordingly (e. g., in cases of cardiovascular syphilis or neurosyphilis); if, however, careful study discloses no demonstrable abnormalities (i. e., if the patient truly has latent or healed benign late syphilis), no departure from the usual system of continuous, intensive treatment is required.

The employment of special measures for the treatment of such patients is neither necessary nor desirable. "High pressure" intensification of treatment by the use of unusually large doses or short intervals is not necessary because it subjects the patient to an increased risk of reactions to treatment without the offset of an improvement in prognosis. "Drug shopping" is inadvisable except in a few instances which require individualized expert judgment. Finally, and particularly to be condemned as unproved and unnecessary and as imposing an unjustified risk on the patient, are

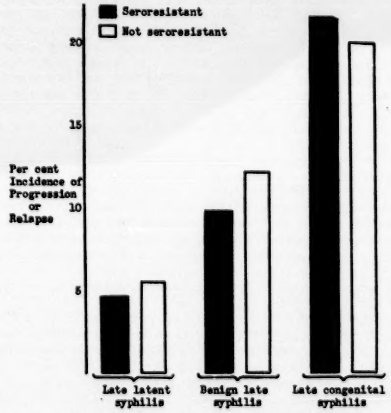

Chart 6.—Lack of relationship between seroresistance and the incidence of progression or relapse in patients with various forms of neurosyphilis. (From data of the Cooperative Clinical Group, Goodman and Wasserman and Smith.)

efforts at reducing a positive reaction to the serologic test for syphilis to negative by nonspecific methods, especially artifically induced fever. The prolongation of the usual system of continuous treatment to two full years, with the additional safeguard to the patient of periodic observation for the rest of his life, will accomplish the desired result of maintenance of good health in the vast majority (probably 95 per cent) of patients with seroresistant late syphilis.

5. The control of treatment of neurosyphilis by repeated examination of the spinal fluid, it is again emphasized, is excluded from this consideration.

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MANAGEMENT OF THE PATIENT

In these days of great publicizing of syphilis to the public, the practitioner charged with the care of a patient with seroresistant syphilis may find the actual administration of treatment much less troublesome than the necessity for assuaging the fears and foibles of the partly informed and anxious patient. To him the persistence of a positive reaction to the serologic test is most disconcerting, especially if he came under treatment with no lesions but only the positive reaction to the serologic test, accidentally discovered. No generalizations for procedure under these circumstances are possible, but according to our experience the best results are obtained by as complete a discussion of the situation as the information and grasp of the patient will allow, with large amounts of reassurance.

804 Medical Arts Building.

ABSTRACT OF DISCUSSION

DR. JOHN G. HOPKINS, New York: What is a positive Wassermann reaction? What causes a positive Wassermann reaction? Does a positive Wassermann reaction mean the existence of spirochetes? Without knowledge of the true answers to those questions it is extremely difficult to rationalize our advice and treatment of the patient with a persistently positive Wassermann reaction. Granted that it is said that it is best to assume that a positive Wassermann reaction means persistence of spirochetes, it is well known that they may be persistent in the presence of a negative Wassermann reaction. I don't know of any more distressing problem than the patient who comes with one of these persistent positive Wassermann reactions. Even if one arrives at the conclusion that at least so far as the latent syphilitic patient is concerned he is in no worse and possibly is in a better condition than the patient with the negative Wassermann reaction, that does not relieve his psychic trauma. I think the two most significant charts, the most interesting of all that the authors presented, were the two which showed the frequency of later relapse in early patients with persistent seroreactions, and in late patients with persistent seroreactions. I had never realized there was that contrast between the two groups. There are two questions that I should like to raise with regard to the management of these cases. One is, Do the authors advise anything in the way of chronic treatment? It has long been a practice—I can't believe that it is purely personal—in such cases to advise something like one course of a mercurial treatment a year, or one course of bismuth treatment a year, or something else, over a long period, with the idea that one might prevent a later relapse. Do their studies show whether any sort of prolonged intermittent therapy does really give any protection, or conceivably does it perhaps increase the possibility of further relapse? The other question is this: Assuming that a positive Wassermann reaction means syphilis in the absence of other signs, and that the reaction becomes negative under treatment, according to these figures the patient's chances of future trouble are a little greater than those of the man whose reaction remained positive. Now, are there any real figures as to the value of this treatment of patients with entirely latent syphilis? Does one really accomplish anything? That is the question on my mind, and I should like to know whether there are any figures on it.

DR. PAUL A. O'LEARY, Rochester, Minn.: There is one feature of latency that the authors did not discuss: that is, the significance of the age factor, the age of the patient and the "age" of the syphilis. The duration of the syphilis is of prime importance in interpreting the significance of latent syphilis in a given case. As Drs. Moore and Padget said, early latency has an entirely different significance than does late latency. For example, a young patient who has had syphilis for four or six years and who is manifesting latent syphilis, with a positive blood Wassermann reaction, the spinal fluid and cardiovascular system both being negative, is not in a safe position. On the other hand, if a person has had syphilis for twenty years and has the same setup, the serologic positivity in the latter case certainly does not have great significance. The first case may be in the transient phase of latency, while the second one is probably in the permanent phase of latent syphilis; so in talking about the treatment of latency, which lends itself readily to discussion because we are not familiar with the biologic background of its cause, the need for the treatment of latency is dependent on the age factor of the individual plus the duration of the syphilis. One other point worthy of emphasis is that latency in women is a different problem than it is in men, because a woman with latent syphilis may give birth to a syphilitic child although she was well treated during the early phase of the syphilis. In other words, the amount of treatment a woman receives previous to becoming pregnant has but little influence on the outcome of the pregnancy and, in order to assure her of normal offspring, treatment must be given to women with latent syphilis as early in the course of the pregnancy as possible. I think it is a great misfortune that the term Wassermann fastness has become so popular. Its popularity is due to the fact that it offers an easy way for the physician to explain an unsatisfactory situation. Wassermann fastness is not a clinical state; it is merely a group of serologic reports. I believe that the point made by the authors should be emphasized; namely, that in discussing Wassermann fastness one must first determine the clinical status of the patient, because Wassermann fastness has entirely different meanings in the different clinical stages of syphilis. In early syphilis it is a bad omen, while in late syphilis, such as hepatitis or aortitis, the persistently positive Wassermann reaction is to be anticipated, while in latency the significance of the positive Wassermann reaction can be determined only after long observation. Accordingly, when using the term Wassermann fastness it is essential that one first determine that the patient is in the phase of latency, that he does not have an aortitis or hepatitis and that the spinal fluid is negative.

DR. PAUL PADGET, Baltimore: Dr. O'Leary answered the second question of Dr. Hopkins better than I possibly could have. Doubtless, that is the answer. The decision regarding treatment of the patient with latent syphilis, or regarding the interpretation of serologic resistance, depends on many factors which are highly individualized. These have not been, at our hands, subjected to mass analysis because they don't lend themselves well to statistical study. Perhaps some one will work out a method for approaching the problem, but we haven't as yet. Regarding the question of Dr. Hopkins about chronic treatment, that too has not been subjected to statistical study, but on the matter I have a very strong clinical impression. Many will agree that there are certain patients who have had more or less treatment for latent syphilis who are perfectly well symptomatically and who will remain so during their lives. Others, after treatment is suspended, develop symptoms which respond to very small amounts of what can be described as chronic therapy. That is quite irrelevant to the problem of seroresistance, but it is a comman clinical observation.

Anatomy of the Liver.—The mass of liver substance consists of units of structure called lobules. A lobule is shaped like a polygonal prism which has five, six or seven sides and which, on cross-section, has a diameter decidedly smaller than the height. Running through the center of the lobule in its long axis is the central vein, a branch of the hepatic vein, while at the periphery are branches of the portal vein and of the hepatic artery, the interlobular bile ducts, lymphatic vessels and connective tissue. The principal afferent vessel of the liver is the portal vein, which collects the blood from the digestive tract and the spleen. It enters the liver with the hepatic artery at the portal fissure. The blood from the liver is drained by the hepatic veins, which enter the inferior vena cava. The liver cells are polygonal and have six or more surfaces. They are arranged in cords which form columns extending radially from the central vein to the periphery of the lobule, the general direction being perpendicular to the central vein. Between them are broad, irregular, thin-walled blood spaces known as sinusoids, which connect the ends of the interlobular branches of the portal vein and the branches of the hepatic artery with the intralobular central vein. They are lined by cells of two types, the undifferentiated lining cells and the Kupffer cells.—Astrachan, Morris: Jaundice in Children, *Am. J. Dis. Child.* **53**:137 (Jan., part 1) 1937.

HUMAN AUTONOMIC PHARMACOLOGY

XII. THEORIES AND RESULTS OF AUTONOMIC DRUG ADMINISTRATION

ABRAHAM MYERSON, M.D.

BOSTON

For the past year and a half the research division of the Boston State Hospital has been carrying on experiments on the reactions of the organs of the human being to drugs which are specifically factors in the pharmacology of the autonomic nervous system. These experiments have reached the stage where a general paper will make clear the fundamental principles and facts of human autonomic pharmacology.

The older theory of the activity of the bodily functions, so far as these are under the control of the autonomic nervous system, is that a balance exists between the activities of the sympathetic and the parasympathetic division, so that visceral function is a sort of resultant of the balance of these two forces. If one translates the anatomic units of this theory into chemical terms, the activity of any organ involved by autonomic stimulation is the result of a balanced activity between acetylcholine, which is produced by the parasympathetic nervous system, and the more hypothetic series of chemical substances produced by the sympathetic nervous system at the neurovisceral junction, which are called sympathin E and I. Since the sympathins are more or less like adrenin, the chemical concept of balance may be stated as the resultant of the effects of cholinergic and adrenergic substances.

To this concept there has been added by a long and brilliant series of researches the hypothesis of the activity of the esterases (chart 1), substances produced either by the reacting cells or by the tissues in general. These substances, and especially the one described by Stedman as choline-esterase, are believed to hydrolyze or destroy acetylcholine and consequently make the action of the parasympathetic nervous system intermittent. No antagonist at present known operates in similar fashion on sympathin, and the question of whether or not there are such substances cannot be precisely studied until sympathin has been isolated. Thus, to the concept of a balance between acetylcholine and sympathin must be added the factor of the esterases—their quantity, activity and relationship to the amount of acetylcholine produced by the organism.

An examination of the results of autonomic pharmacologic experiment shows the inadequacy of even this concept of balance to explain all autonomic functions. There are organs which have only one set of innervating structures, such as the ciliary muscles. Moreover, our experiments have shown that while there are some functions of organs which are apparently autonomically balanced, there are other functions in the same organs which respond to only one type of drug and consequently are either cholinergic or adrenergic. Furthermore, there are structures, such as the sweat glands, which are anatomically innervated by the sympathetic system alone but nevertheless are entirely or mainly cholinergic in chemical function; that is, they respond only to chemicals of the acetylcholine group and not at all to chemicals of the adrenergic type, although they would be expected to respond to the latter because of their anatomic structure.

In obtaining the results which are summarily recorded in this paper, four chemical substances [1] have been used (chart 2).

1. Mecholyl (acetyl-beta-methylcholine chloride) has been used as the cholinergic drug. Its action does not, however, entirely correspond to that of acetylcholine. Moreover, it is much more powerful than acetylcholine and is not so readily destroyed by the esterases. The dose varies enormously for different persons but is fairly constant at different times for the same person.

2. Benzedrine sulfate (benzyl-methyl carbamine or beta-phenyl-isopropylamine) has been used as the adrenergic drug. Here, too, the parallelism to the natural chemicals is not complete, but for practical purposes its effects correspond, except in a few instances. The drug can be administered by mouth. Its effects are prolonged, and consequently it has distinct value both experimentally and clinically.

3. Atropine sulfate (mandelic ester of tropine) has been used as the drug which inhibits the action of the

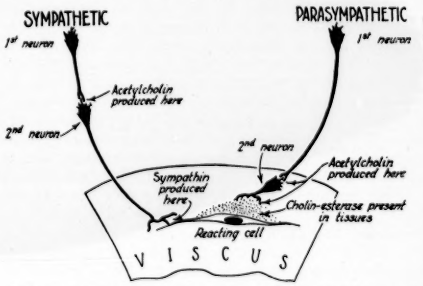

Chart 1.—Balance between sympathetic and parasympathetic nerves and esterase.

parasympathetic nervous system or, more chemically, stops or prevents the action of acetylcholine or mecholyl. This action probably does not take place by paralyzing the parasympathetic system, as has been supposed, but, as Loewi has shown, takes place in or near the reacting cell. Whenever a balance obtains between cholinergic and adrenergic substances, atropine by removing the cholinergic factor acts as a synergist to the adrenergic or, in these experiments, the benzedrine result.

4. Prostigmin (dimethylcarbamic ester of m-Oxyphenyl-trimethylammonium methylsulfate) enters into such chemical union with either acetylcholine or mecholyl so as to stabilize it, or with the esterases so as to prevent their action on mecholyl, and consequently enormously enhances the effects of this drug. It is therefore the synergist of mecholyl, as it is of acetylcholine.

Since these drugs were used in systematic relationship to one another and to the various functions of the body, the results of the experiments at the Boston State Hospital on the human being throw direct light on the autonomic pharmacology of the organs and the functions of the body.

Read before the Section on Pharmacology and Therapeutics at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 10, 1937.

From the Division of Psychiatric Research, Boston State Hospital, aided by grants from the Commonwealth of Massachusetts and the Rockefeller Foundation, with supplementary grants from the Milton Fund, Harvard University, and the Herbert L. Celler Foundation.

1. Merck & Co. furnished the mecholyl; Smith, Kline and French Laboratories, the benzedrine, and Hoffmann LaRoche, Inc., the prostigmin.

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The following summary of the effects of these drugs on the organs of the body is based on original material presented elsewhere:

1. *The Eye.*—(*a*) The pupil constricts with cholinergic stimulation. Thus, mecholyl instilled into the conjunctival sac in proper dilution (from 2 to 10 per cent) constricts the pupil. This reaction is also brought about by the drugs which inhibit the esterases—physostigmine and prostigmin (from 2 to 10 per cent). It is abolished by the drugs which inhibit the action of the acetylcholine produced by parasympathetic stimulation and of mecholyl introduced by instillation, such as atropine, scopolamine and stramonium. The pupil dilates as a consequence of the instillation of adrenergic drugs, such as epinephrine and benzedrine (from 1 to 4 per cent). Moreover, this reaction is increased when atropine is used together with either epinephrine or benzedrine. The size of the pupil is thus a balanced function.

(*b*) The light reaction of the iris is definitely a balanced function. The cholinergic substances permit the reaction of the pupil to light until such a time as complete miosis is established. Prostigmin permits the reaction of the pupil to light. Atropine inhibits the reaction of the pupil to light. Benzedrine diminishes the reaction in direct relation to the concentration of the instilled solution, so that a strong solution will make the pupil rigid to flashlight stimulation, but in broad daylight the reaction of the pupil is always present after instillation of benzedrine.

(*c*) Intra-ocular tension is in part a balanced autonomic function. It is diminished by the instillation of mecholyl or acetylcholine and by prostigmin and physostigmine. This effect is abolished by atropine, which increases tension. Benzedrine in strong concentration (10 per cent and more) increases intra-ocular tension, while benzedrine plus atropine is decidedly synergistic in relation to intra-ocular tension.

(*d*) The ciliary muscle of the eye is anatomically exclusively parasympathetic. This muscle is innervated by the parasympathetic system from a nucleus in the third nerve group. The first neuron starts in this nucleus and goes to the ciliary ganglion. The second neuron starts in the ciliary ganglion and goes to the ciliary muscle. The contraction of the ciliary muscle releases the tension exerted on the lens of the eye by the ligament of Zinn, and the anterior surface of the lens consequently becomes more convex. When the ciliary muscle relaxes, the ligament squeezes the capsule into flatter shape, thus accommodating for distance. That the chemical effects are in part consistent with the parasympathetic innervation is shown by the following facts: Mecholyl increases the accommodation of the lens, especially in presbyopia. After the instillation of mecholyl, the presbyopic subject can read for a short time without glasses. This reaction is also brought about by the instillation of physostigmine or prostigmin. Prostigmin works better than mecholyl in this respect. When the two drugs are combined, the increase in accommodation is very marked. Atropine prevents and destroys this effect of mecholyl and prostigmin, and, in fact, of itself brings about a paralysis of accommodation. This action may be explained on the basis that atropine prevents the produced acetylcholine from reaching the reacting cells. Benzedrine would be expected to have no effect on the accommodation, since it is a sympathomimetic drug. This expectation is not borne out by the facts. Benzedine tends to disturb the accommodation of the lens in the same way that atropine does. When it is used in weak solution and on the young person, the proximal point for near vision is increased. In the presbyopic subject even a weak solution will produce a marked disturbance of accommodation, while clearness of vision is definitely obscured in all subjects. This effect probably occurs through direct relaxing action on the ciliary muscle or possibly on the lens.

2. *Sweat.*—The production of sweat is a cholinergic function, although sympathetic in innervation. Mecholyl and pilocarpine cause marked alkaline general sweating. Localized sweating can be brought about by intradermal injection. This effect is greatly enhanced by prostigmin, although in itself this drug produces no sweating. Atropine abolishes or prevents these effects. Epinephrine and benzedrine have no effect in ordinary doses on the sweating.

3. *The Circulation.*—(*a*) The heart: The conductivity of the bundle of His is decreased by cholinergic stimulation. This is quite definitely shown in our experiments by the electrocardiogram. The lengthening of the interval between P and R components is enhanced by the substances which destroy the esterases, such as prostigmin. Combining mecholyl and prostigmin lengthens the distance between P and R to the point of heart block. Further confirmation of this balance is seen when atropine is administered after mecholyl or mecholyl and prostigmin. Shortly after this drug is introduced the normal PR interval is reestablished and heart block of this pharmacologically induced type disappears.

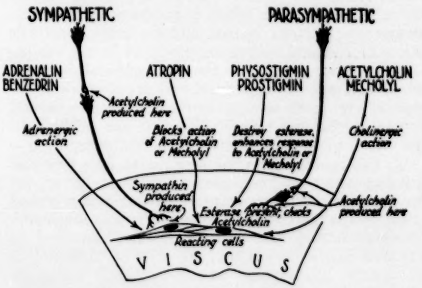

Chart 2.—Working hypothesis of human autonomic pharmacology.

(*b*) The blood pressure: This is a balance. Mecholyl, injected intramuscularly or otherwise, lowers the blood pressure and brings about vasodilatation. The use of prostigmin enormously enhances this effect, although in itself prostigmin does not affect the blood pressure. Atropine abolishes this effect of mecholyl or acetylocholine, and the blood pressure rises to normal or even higher. Benzedrine (or epinephrine) markedly increases blood pressure, and this effect is enhanced if atropine is used to paralyze or to inhibit the effect of the body's acetylcholine.

(*c*) The pulse rate: Mecholyl acts rather paradoxically on the pulse rate. Its first effect in moderate dose (from 15 to 30 mg.) is to increase the pulse rate by direct effect on the pacemaker. If large doses are given, the effect of lessened conductivity becomes pre-

dominant and slow pulse finally results. If prostigmin is given in sufficient dose together with or preceding mecholyl, the pulse is markedly slowed. Atropine abolishes the effect of mecholyl if given in sufficient dose intravenously. Benzedrine is also paradoxical in its effect on the pulse rate. It tends to slow the heart rate although not markedly. If it is given with atropine, the pulse rate is greatly increased.

Thus, so far as the heart rate is concerned, mecholyl should be supplemented by prostigmin in order to get full parasympathetic effect, while to benzedrine, atropine must be added for typical sympathetic results.

4. *The Gastro-Intestinal Tract.*—(*a*) Gastric and intestinal tonus is a balance between acetylcholine, sympathin and the esterases. The gastro-intestinal tonus is greatly enhanced by mecholyl, especially if the bowel and stomach are atonic. This effect is markedly increased by previously or simultaneously administered doses of prostigmin. If sufficient prostigmin is used, a very small dose of mecholyl will produce profound results. This effect is abolished by atropine. The gastro-intestinal tonus is diminished by benzedrine, epinephrine and ephedrine—adrenergic drugs. Thus, benzedrine relaxes spasm of functional or organic type rapidly. This effect, however, does not appear to be enhanced by atropine, or at any rate the results are not predictable.

(*b*) The secretion of the juices of the stomach may be a balance, but this is not clearly demonstrable. Mecholyl abolishes acidity and renders juice alkaline, but since this is accompanied by an alkaline mucus it may not be a "balanced" result. It also increases the amount of the juices, and pepsinogen disappears. Prostigmin enormously enhances these effects, showing that esterase is a factor. Atropine abolishes or prevents these results of cholinergic stimulation, while benzedrine increases acidity and pepsinogen content but diminishes the amount of gastric juice. Atropine is synergistic to benzedrine in producing these effects.

(*c*) The relaxation of the gallbladder is brought about by both sets of drugs. Mecholyl and mecholyl plus prostigmin delay the emptying of the fatty meal. Atropine, however, causes similar, but more marked effects. Benzedrine causes a delayed atonic reaction, so that after two hours the gallbladder does not empty after a fatty meal.

5. The tonus of the genito-urinary bladder is a balance. Mecholyl has some slight constricting effects on the full bladder. The esterases seem to have a very important rôle, because prostigmin added to mecholyl greatly enhances the bladder tonus, constricting the bladder to one third of its normal size and capacity, although by itself prostigmin has little effect. Atropine relaxes the bladder after the effects of prostigmin and mecholyl have been obtained. Benzedrine relaxes bladder tonus very moderately, and atropine is synergistic in this respect.

COMMENT

In using these drugs, namely, mecholyl, benzedrine, prostigmin and atropine, certain definite and general principles must be kept in mind. Any increase in the amount of prostigmin used renders mecholyl enormously effective and to the point of danger to the patient. A dose above 1 mg. of prostigmin makes it undesirable to use mecholyl in any amount above 5 or 10 mg. A safer dose of prostigmin is 0.5 mg. (These figures apply only to intramuscular injection; the use of prostigmin by mouth has a wider range of safety.) Moreover, atropine should always be held in readiness whenever mecholyl is to be used alone therapeutically or experimentally. Practically speaking, there is no danger, no matter what the effect of mecholyl may be, if atropine is used intravenously or intramuscularly in sufficient dose. The administration of one-fiftieth grain (0.0013 Gm.) intravenously blocks, practically speaking, all effect of mecholyl.

If, however, prostigmin is used in addition to mecholyl, atropine is not sufficient to check the effects. Evidently the choline-esterase and atropine are synergistic so far as blocking the effects of mecholyl is concerned. Consequently, whenever the esterases have been removed as a buffer to mecholyl by the use of prostigmin, it is advisable to add epinephrine, benzedrine or, better still, the combination of the two, to the atropine. With such treatment the ill effects of excessive doses rapidly disappear.

It is probable that the electric current will furnish an important and useful way of introducing mecholyl for therapeutic purposes. In cases of gastro-intestinal disease and in the experiments carried out on blood pressure, it has been possible to maintain a mild general effect for hours, so that, for example, the juices of the stomach became definitely alkaline and mucous without any profound disturbances of blood pressure and heart rate and without the creation of marked general sweating.

It is to be kept in mind that benzedrine and atropine are synergists and that when the combination is used the dose of each drug must be reduced in order to get any beneficial effects without too many untoward results. The mood effects of benzedrine are best produced by small doses, and in many cases 2.5 mg. two or three times in the morning will produce far better results than large doses. In fact, it may be stated that the mood effects occur beneath the threshold at which the visceral changes take place.

These experiments also indicate that it is possible by pharmacologic experiment to reproduce many of the so-called symptom complexes. Thus, achylia gastrica is simulated by the action of mecholyl. Heart block can be readily produced by prostigmin and mecholyl. The spastic condition of the colon, as well as the atonic one, can be reproduced by the use of mecholyl and benzedrine, respectively. If sufficient prostigmin is used, the presbyopic eye can be transformed for a time into the myopic eye. In other words, the gradually developing theory that repeated functional disturbances may eventuate into organic disease has at least a working basis in the effects of these drugs.

Perhaps the most novel general implication is the emphasis to be laid on the esterases. These products of bodily activity have an important rôle in the regulation of cholinergic or parasympathetic activity. There may be, and it seems likely that there are, conditions of hyperesterasia, that is to say, situations in which the esterases are present in too great a quantity to permit the free working of the acetylcholine produced by the body. This might well be the case in presbyopia. On the other hand, there are conditions in which hypoesterasia may be postulated, as when there is hyperactivity of cholinergic type or of parasympathetic origin. Heart block might thus be interpreted. It will be necessary to isolate the esterases before this hypothesis can be tested against fact.

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THE REFLEXES IN THE PROGNOSIS OF TRANSVERSE LESIONS OF THE SPINAL CORD

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The question of the reflex functions of the spinal cord in man, as one so often discovers in reviewing neurophysiologic matters, is one in which even incomplete elucidation has been surprisingly recent. Until the last decade of the last century, despite the comparative frequency with which injuries and other lesions produce physiologically and even anatomically complete division of the spinal cord, the clinical manifestations, as reflected by the reflexes, had not been accurately recorded. It was generally understood that the great motor pathways exert an inhibitory influence on the deep reflex arcs of the lower extremities and that transverse destruction of the spinal cord should therefore result in exaggeration of such reflexes.

In 1890 Bastian [1] made the first important contribution in regard to correcting this conception. He stated that a complete lesion in the lower cervical or upper dorsal levels resulted in flaccidity of the limbs and absence of the tendon reflexes. He was shortly supported by other clinicians, notably Bruns,[2] in Germany, and we now know as Bastian's or as Bastian-Bruns' law that "if there is a complete transverse lesion in the spinal cord cephalad to the lumbar enlargement, the tendon reflexes of the lower extremities are abolished."

In 1902 Warrington [3] modified this law in the respect that "when the disease is of a slowly progressive nature the reflex functions of the cord may be retained." That is, he limited the application of the law to immediate or rapidly developing conditions. Experimentally this contention is confirmed, and the loss of tendon reflexes which obtains in cases of acute transverse lesions of the spinal cord is now accepted as being a part of the complex known as "spinal shock," investigation of which was largely instigated by Sir Charles Sherrington.[4]

The greatest clinical contributions toward completing the chronicle of what happens to the reflexes after rapid or immediate physiologic section of the spinal cord were the result of the opportunities for observation of such injuries afforded by the Great War. In a paper by Riddoch,[5] written in 1917, material from many sources was digested and added to his own, and the conclusion was reached that after an initial period of "spinal shock" and absent reflexes there is a recovery of reflex activity of a modified and diffuse sort. This exists until the death of the patient, except for the intervention of such toxic febrile states as are induced by urinary sepsis or infected decubitus ulcers, which have the effect of depressing reflex functions to the point of inanity.

In summary, it is now recognized that a reasonably rapidly produced total transverse lesion of the spinal cord in man will result clinically in (1) a stage of muscular flaccidity and completely lost tendon and plantar reflexes, usually lasting from one to several weeks, (2) a stage of reflex activity, of variable duration depending on the occurrence of any toxic febrile state, and (3) a final stage of inanition. There are rare exceptions in which the first stage is permanent, particularly when the level of the lesion is caudal enough to approach the lumbar enlargement. There are also cases in which there is some response from the outset to plantar stimulation, either flexor (Holmes [6]) or extensor (Collier [7]). In the main, however, these rules are axiomatic.

As a corollary to Bastian's law, clinicians have come to recognize that absence for any length of time of the tendon and plantar reflexes of the lower extremities associated with conditions causing transverse lesions of the spinal cord is a grave prognostic sign. This is true not only of mechanical trauma but also of such lesions as malignant metastases to the spine and epidural abscesses and indeed of anything which physiologically blocks the transmission of ascending and descending impulses It is not uncommon in cases of concussing and nonpermanent injuries of the spinal cord to find a transitory flaccidity and depression of the tendon reflexes; but when these conditions persist more than a few hours, or a day or so at most, practical experience has taught that a geometrically progressing pessimism as to any return of useful function is the safest attitude.

This also applies to surgical lesions which press on the spinal cord. Many physicians have seen benign neoplasms slowly produce complete spastic paraplegia with retained reflexes, existing many months, and a spectacular return of function after removal of the cause despite the grossest deformity of the cord itself. On the other hand, when one sees paraplegia going on to completion within a week or ten days and finds flaccid lower extremities, with the tendon reflexes absent, instinct warns that the lesion is probably malignant and possibly metastatic. Experience dictates that even though operation satisfactorily removes the mass and restores and maintains the normal dynamics of the cerebrospinal fluid, the prognostication for the distal segment of the cord must be unfavorable. Removal of the identical type of lesion shortly before the reflexes are lost may permit recovery, sometimes lasting years with the aid of roentgen therapy. The same is true of epidural abscesses. I have operated on four patients. In two "spinal shock" was not complete in that the reflexes were retained. Those patients recovered useful function. In the other two the abscesses had had time to produce flaccid paraplegia with absence of the reflexes. Those patients recovered from the infection but never from the paraplegia and instead went on through the same stages as those observed in patients with actual mechanical transection of the spinal cord.

One qualification should be elaborated here with respect to malignant processes and epidural abscesses; that is, that they have the faculty of inducing "spinal shock" more quickly than their mere mechanical pressure would justify. It is not at all infrequent for benign lesions, such as meningiomas and neurofibromas,

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1. Bastian, H. C.: Symptomatology of Total Transverse Lesions of the Spinal Cord, with Special Reference to the Condition of the Various Reflexes, Med.-Chir. Tr. **73:** 151-217, 1890.
2. Bruns, Ludwig: Ueber einen Fall totaler traumatischer Zerstörung des Rückenmarkes an der grenze zwischen Hals- und Dorsalmark, Arch. f. Psychiat. **25:** 759-830, 1893.
3. Warrington, W. B.: Some Recent Work on the Condition of the Deep Reflexes and Other Symptoms in Transverse Lesions of the Cord: A Critical Review, M. Chron. **4:**101-119, 1902-1903.
4. Sherrington, C. S.: The Integrative Action of the Nervous System, New York, Charles Scribner's Sons, 1915.
5. Riddoch, George: The Reflex Functions of the Completely Divided Spinal Cord in Man, Compared with Those Associated With Less Severe Lesions, Brain **40:** 264-402 (Nov.) 1917.
6. Holmes, Gordon: Spinal Injuries of Warfare: Goulstonian Lectures, Brit. M. J. **2:** 769-774 (Nov. 27) 1915.
7. Collier, James: Gunshot Wounds and Injuries of the Spinal Cord, Lancet **1:** 711-716 (April 1) 1916.

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to bring on paraplegia rapidly after a more or less prolonged prodromal period of vague, indefinite symptoms. This usually occurs when the neoplasm finally attains sufficient size to become completely jammed in the dural sheath and so produces edema and anoxemia in the contiguous cord, and it may also happen because of shift in position with the same end result, as witness the occasional marked exacerbation in symptoms following lumbar puncture. In such instances the reflexes are lost with exceptional rarity, and the condition may exist a long time without causing irreparable damage. Abscesses and malignant processes, however, apparently possess the additional property of being toxic to neighboring structures, and this, in the spinal cord, hastens its destruction.

The point therefore of this discussion is that the astute observer has come to rely greatly on the tonicity of the muscles and the state of the tendon reflexes of the lower extremities during the initial stages of any paraplegia in determining what his predictions for the future are to be. Granted that mechanical trauma to the cord may merely concuss it and produce transitory flaccidity and loss of reflex activity,[8] a continuance of this condition for any length of time almost invariably indicates permanent and complete disability. In the case of paraplegia caused by neoplasms and infections, the same prognosis applies to an even shorter-lived appearance of the manifestations of "spinal shock."

In view of the foregoing criteria it may be well to mitigate the usual hopelessness of continued flaccid paraplegia with absent reflexes by citing a case:

V. H., a man, aged 25, an office clerk, admitted March 11, 1934, on the recommendation of Dr. George B. Hassin, first noticed a heavy feeling in his legs eight years previously, while in high school. His legs tired easily on standing or exercise, and when he endeavored to play tennis or any similar sport he would be forced to quit in a few minutes because his "legs gave out." This condition became progressively worse and became associated with so much spasticity that the patient finally experienced the greatest difficulty in locomotion. There were no associated sensory change and no difficulty with the sphincters, and the disability was confined to the lower extremities. The deep reflexes in the legs were markedly exaggerated, and there were pronounced pathologic reflexes bilaterally. There were no sensory changes of any type, nor were there any abnormal neurologic conditions elsewhere in the body, even the epigastric, abdominal and cremasteric reflexes being present. A lumbar puncture was performed, and it revealed clear and colorless fluid with an initial pressure of 100 mm. of spinal fluid. There was no block on jugular compression, and the cell count and total protein content were normal. The Wassermann reaction was 2 plus in a 0.5 dilution, and the colloidal gold reaction showed a curve of 1112221100. The Wassermann reaction of the blood was negative.

This patient had been in several institutions previously, where therapy of all kinds had been administered to him without any apparent effect on the slow progress of his condition, and, since he was on the verge of being completely incapacitated, he was desperately anxious for operation to be performed. Since Hassin[9] had reported several similar cases in which there were arachnoid changes in the thoracic section of the cord even in the absence of dynamic changes in the fluid and had had good results in two reported cases from operations for this condition, operation was urged and finally agreed on by all concerned. I accordingly went ahead on March 12, and the following is an extract from my operative note of that date: "Laminectomy was unusually simple and bloodless. The seventh, eighth and ninth dorsal vertebrae were delaminated. Normal looking cord was exposed, surrounded by somewhat thickened arachnoid, which was rather adherent to the cord. The arachnoid was opened throughout the operative wound and a soft rubber catheter passed 15 cm. caudally and cephalad without difficulty."

The operative note of March 13 tells of the events in the hours following operation: This boy has had a disconcerting thirty-six hours. After yesterday morning's procedure he was perfectly able to move his legs as before and had normal sensation. This persisted all day and evening, and the patient voided normally during the evening. This morning on awakening, he noticed a prickly feeling up to the umbilicus. His legs could still be moved, but not as well as formerly. This paresthesia increased during the day, and the legs became progressively weaker, so that by midafternoon there was complete paraplegia with a sensory level at the umbilicus, below which sensation was nearly gone. The deep reflexes of the legs were still present. I saw the patient at this time and immediately reopened the operative wound. A moderate amount of blood had clotted in the canal, and I removed it as best I could. A gutta-percha drain was placed in the canal and the wound closed. After this procedure, while he was still in the operating room, the patient could move the toes of his left foot.

After a few hours' relief, however, the transverse lesion progressed, and my note of March 14, the day following the secondary procedure, states that there was complete flaccid paraplegia with a complete sensory level, a complete abolition of all deep reflexes and a complete loss of control of the sphincters. There was no response to attempts to elicit a Babinski reflex. On March 15, the second postoperative day, I was able to obtain a slight knee and ankle jerk on the right side, and the patient thought he had slight sensation in the left leg. On March 16, the third postoperative day, however, no deep reflexes and no plantar response could be obtained in either leg, and this condition still persisted on March 18, the fifth postoperative day. On this day there were also some fibrillary twitchings of the small muscles of the left foot.

In desperation, in view of the fact that the reflexes had been entirely absent for five days except in one leg for a transitory period, the operative wound was reopened; the note of that date states as follows: "This boy still has signs of a complete transverse softening. I thought it best once more to look in, and accordingly reopened the wound. There was little blood in the wound, and the dura was quickly uncovered and found to be pulsating freely and normally. The wound was reclosed with drainage, and testing immediately after the operation revealed complete absence of all reflexes and of all sensation."

The patient remained in the hospital for some time, and a discharge note of April 3, twenty-three days after the original operation, states that there was still a sensory level at the ninth dorsal segment but that there was a just beginning slight indication of recovery of function, shown by a vague sensation to pin prick in the left extremity and a barely perceptible knee and ankle jerk in the right extremity. Complete flaccidity was still present, all reflexes were still absent in the left leg, there was no voluntary motion on either side and there was no control of the sphincters.

From that time until now, an interval of approximately three years, the patient has improved. He is able to rise from his chair with the aid of two canes, to walk about the house by himself, to mount the stairs to his bedroom and lavatory on the floor above and to descend the front steps to enter his automobile. He is continent of urine and feces, voiding at intervals of about four hours. His legs are spastic, and his knee and ankle jerks are bilaterally exaggerated and associated with clonus. The Babinski reflex is bilaterally present. There is no definite sensory level, but the right leg is more useful than the left and is slightly more hypesthetic. The patient is sexually potent.

COMMENT

It is obvious that a desperate attempt was being made in this case to salvage what seemed an irre-

8. Hugh Cairns and George Riddoch (Observations on the Treatment of Ependymal Gliomas of the Spinal Cord, *Brain* **54**: 117-146 [June] 1931) described instances of this in the postoperative course of two patients operated on for ependymal gliomas of the cord with subsequent satisfactory return of useful function. In one case, however, one knee jerk was never lost and voluntary power for but a few hours; in the other an early disappearance of flaccidity may be assumed because muscular spasms began during the second twelve hours after ether anesthesia. Voluntary motion of one leg in the second case occurred on the third day, the day the tendon reflexes began reappearing.

9. Hassin, G. B., and Andrews, Edmund: Serous Spinal Meningitis (Circumscribed), J. A. M. A. **92**: 877-880 (March 16) 1929.

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trievable accidental complication. That the effort succeeded in a measure is beside the point. The value of the report lies in the demonstration that even in the face of what seem inexorable precepts there are exceptions to the rule.

SUMMARY AND CONCLUSIONS

1. Paraplegia from any source, whether traumatic, neoplastic or infectious, when associated with complete flaccidity and total absence of tendon reflexes existing more than a day or two in the first instance and more than a few hours in the other two, is an almost hopeless prognostic sign despite removal of the cause.

2. In the treatment of acute conditions causing paraplegia, such as epidural abscess and malignancy, immediate operation is therefore advised.

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ABSTRACT OF DISCUSSION

DR. JAMES L. POPPEN, Boston: Dr. Oldberg has emphasized that prognosis varies greatly as to the return of useful function following removal of the cause in conditions producing transverse lesions of the spinal cord. A guarded prognosis must be given in most cases of transverse lesions, especially those caused by neoplasm. This holds true for either the extramedullary or the intramedullary type, provided enucleation can be accomplished without added damage to the cord directly or its blood supply. Our results are much the same as those of Dr. Oldberg. An acute and a subacute epidural abscess has caused unfavorable results in cases in which there was associated myelitis or thrombosis of the intrathecal vessels, but the results have been satisfactory in patients with uncomplicated epidural abscess in whom adequate drainage was instituted. The ultimate prognosis in cases of malignant metastatic lesion of the spinal cord is unfavorable. Nevertheless useful function in many instances may be restored for a time with high voltage roentgen therapy given over carefully mapped out segments of the spinal cord. This is especially true of the Hodgkin's group and holds true in some cases of carcinoma. An extramedullary tumor with a transverse lesion of the spinal cord offers an excellent chance for complete recovery, although caution must be used in making a prognosis in these cases, since persons with long-standing paralysis may regain useful function in a relatively short time after relief of the compression, whereas patients with a short history of paralysis may never regain useful function or regain it only after a long course of extensive physical therapy. That useful recovery does occur after complete extirpation of an intramedullary tumor which involved the entire length of the spinal cord is demonstrated by the following brief case report: H. N., a woman, aged 29, had pain between her shoulder blades in 1928, accompanied by slight weakness of the lower extremities. The condition progressed so that by 1929 she had total paralysis of the lower and partial paralysis of the upper extremities. There was complete incontinence of the bladder and bowels. An exploratory laminectomy Sept. 29, 1930, with removal of the first, second and third dorsal laminae, revealed a swollen cord. Radical surgical intervention was not attempted at this time. Progressive improvement was noted after the laminectomy, so that in 1933 the patient was able to resume work requiring her to stand eight hours a day and could attend dances. In 1935 weakness of the lower extremities again developed, so that by April 1936 she was completely paralyzed, with return of incontinence of the bladder and bowels. In December 1936, when she was first seen at the clinic, a laminectomy was performed extending from the foramen magnum to the third lumbar vertebra. Complete extirpation of a huge intramedullary tumor which involved the entire length of the cord was successfully performed. Slow but progressive recovery of function of the lower as well as the upper extremities took place, so that the patient was able to take a few steps with assistance, June 2, 1937. She had complete flaccid paralysis for two weeks following operation. Dr. Shields Warren reported the tumor to be a neuroblastoma gliomatosum.

DIFFERENTIAL DIAGNOSIS OF PAIN LOW IN THE BACK

ALLOCATION OF THE SOURCE OF PAIN BY THE PROCAINE HYDROCHLORIDE METHOD

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Owing to the scarcity of pathologic evidence, there exists much perplexity as to the origin of the pain accompanying disorders in the lower part of the back, and one wonders whether the old conceptions of the sacrolumbar and sacro-iliac entities are any longer adequate.

In the last two decades certain morphologic factors, principally of the type of anatomic variations, have been variously claimed as producers of pain low in the back, but in most instances no convincing causal connection could be established. For instance, in the question of the long-impinging transverse process and of sacralization, physicians are today far from acknowledging the so-called Bertolotti syndrome (sacralization, sciatica and scoliosis). Although it is a variation of high frequency (17.6 per cent), many doubt its pathogenic significance (Putti,[1] Hass[2]). Zur Verth[3] considered resection not justified.

The case of the horizontal sacrum and other architectural deficiencies making for instability of the lumbosacral joint has a better foundation. When it can be shown where pressure on the lumbosacral articular facets exists, a causal relation must be accepted (Mouchet and Roederer[4]). Also there is no doubt that posterior displacement of the fifth lumbar vertebra is found associated with severe pain in the back (A. D. Smith[5]) and that in the great percentage of patients showing architectural deficiency of the fifth lumbar vertebra some indirect causal connection exists. Dickson[6] mentioned such architectural weakness (increased angle, defective sacrolumbar articulation, sacralization, spinal cleft) in 35 per cent of all spines; 50 per cent of these are symptomless.

Separate neural arch (Chandler;[7] frequency 5 per cent, Willis[8]) is another deformity considered congenital (although the congenital nature is contested by Klose-Gerlich,[9] who found no such deformity in newborn infants), for which direct connection with pain is undecided. So are prespondylolisthesis and spondylolysis, which are associated with pain in the back (Kleinberg[10]). United apophyses of the articular process are often regarded as the cause of pain, but

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An article by K. O. Haldeman on the injection of procaine hydrochloride in the diagnosis and treatment of derangements of certain joints (California & West. Med. **44**: 256 [April] 1936) deals in a more general way with a similar principle.

1. Putti, V.: Lombartrite e sciatica vertebrale, Bologna, L. Cappelli, 1936.
2. Hass, Julius: Welche Ursachen liegen den Rücken- und Kreuzschmerzen zugrunde? Wien. klin. Wchnschr. **42**: 1572 (Dec. 5) 1929.
3. Zur Verth, M.: Monatschr. f. Unfallh., vol. 5.
4. Mouchet, A., and Roederer, C.: Le spondylolisthesis, Rev. d'orthop. **14**: 6 (Dec.) 1927.
5. Smith, A. D.: Posterior Displacement of the Fifth Lumbar Vertebra, J. Bone & Joint Surg. **16**: 877 (Oct.) 1934.
6. Dickson, F. D.: South. M. J. **29**: 365 (April) 1936.
7. Chandler, F. A.: Lesions of the Isthmus of the Laminae of the Lower Lumbar Vertebrae and Their Relation to Spondylolisthesis, Surg., Gynec. & Obst. **53**: 273 (Sept.) 1931.
8. Willis, T. A.: Backward Displacement of Fifth Lumbar; An Optical Illusion, J. Bone & Joint Surg. **17**: 347 (April) 1935; Backache from Vertebral Anomalies, Surg., Gynec. & Obst. **38**: 658 (May) 1924; Separate Neural Arch, J. Bone & Joint Surg. **13**: 709 (Oct.) 1931.
9. Klose-Gerlich, Joachim: Ztschr. f. orthop. Chir. **63**: 31, 1935.
10. Kleinberg, Samuel: Prespondylolisthesis: Backache with Sciatic Radiation, J. Bone & Joint Surg. **15**: 872 (Oct.) 1933.

they are also found incidentally in x-ray examinations without causing pain (Nichols and Shiflett [11]). Putti [1] rejected both sacralization and tropism as adequate causes of pain.

In the final analysis, all congenital anomalies are now considered mainly as predispositional (Steindler,[12] Ayers [13]), though true impingements no doubt occur as the immediate pain-producing factors (Zur Verth [3]).

In the report to the Clinical Orthopaedic Society in 1928 (Billington, Willis and O'Reilly [14]), based on seventy-nine answers to questionnaires, the general discrepancy as to what is considered pain producing is especially noticeable. Arthritis was given in thirty responses, posture in eighteen and trauma with muscle strain in fifteen as the immediate causes and predisposition (by abnormalities) in fifty-three as the remote cause.

There is little in the literature to answer the question of specific allocations of pain: Where and in what tissue does it actually originate?

POSTERIOR DIVISION OF SPINAL NERVES

We propose to approach the problem of allocation of pain first by abandoning the old classification of sacro-iliac and sacrolumbar groups and, secondly, by following the routes of sensory supply to the tissues of the lumbosacral region. To this end it is first of all necessary to differentiate between the territory of the posterior and that of the anterior primary divisions of the spinal nerves and to define anatomically the ramifications of the posterior division as well as the structures which they supply.

The posterior division of the lumbosacral portion of the spinal nerve (fig. 1) supplies the long muscles of the back (sacrospinalis), all the posterior ligamentous structures, the aponeuroses and periosteal attachments, a portion of the gluteal fascia, the lumbodorsal sheath, the supraspinous and interspinous ligaments, the superficial and the deeper iliosacral ligaments, the sacroischial ligaments, and in part the iliolumbar ligament, the intervertebral articulations and the sacro-iliac articulations (Pitkin [15]).

Irritations are apt to produce either sharply localized superficial pressure points at ligamentous and aponeurotic attachments or more diffuse areas of tenderness in muscles and sheaths.

These localized peripheral lesions are capable of producing radiation not only in the posterior but in the anterior division along many different pathways. Furthermore, they produce postural anomalies the same as those produced by irritation of the nerves of the anterior division.

The frequency of radiation of pain low in the back is variously given at from 36 per cent (Steindler [16]) to 60 per cent (Miltner [17]), but, as Kuhns [18] very appropriately put it, "We cannot use with assurance the radiation of pain to various areas of the lower extremity in the differential diagnosis of low back injuries."

11. Nichols, B. H., and Shiflett, E. L.: J. Bone & Joint Surg. **15:** 591 (July) 1933
12. Steindler, Arthur: Diseases and Deformities of the Spine and Thorax, St. Louis, C. V. Mosby Company, 1929.
13. Ayers, C. E.: New England J. Med. **213:** 716 (Oct. 10) 1935; **200:** 592 (March 21) 1929.
14. Billington, R. W.; Willis, T. A., and O'Reilly, Archer: Report for the Clinical Orthopaedic Society, J. Bone & Joint Surg. **10:** 290 (April) 1928.
15. Pitkin, H. C., and Pheasant, H. C.: Sacrarthrogenetic Telalgia. I, J. Bone & Joint Surg. **18:** 111 (Jan.) 1936.
16. Steindler, Arthur: Low Back Pain: An Anatomic and Clinical Study, J. Iowa M. Soc. **15:** 473 (Sept.) 1925.
17. Miltner, L. J.: Low Back Pain: Study of 525 Cases of Sacro-Iliac and Sacrolumbar Sprains, J. Iowa M. Soc. **20:** 473 (Oct.) 1930. Miltner, L. J., and Lowendorf, C. S.: J. Bone & Joint Surg. **13:** 16 (Jan.) 1931.
18. Kuhns, J. G.: Low Back Pain, Rhode Island M. J. **19:** 9 (Sept.) 1936.

ANTERIOR DIVISION

The pathways of the anterior division may be discussed briefly, as they do not involve the immediate problem. Probably the best established localization is that of intraspinous pathologic change in the vertebral canal, the diagnosis of which rests on the combined radiation through the posterior and anterior divisions; the sensory disturbances, paresthesia and anesthesia, motor weaknesses and the reaction of spinal fluid and block symptoms (Mixter,[19] Tamaki [20]), and radiation to the genitalia in tumor of the cauda equina (Mixter and Barr,[20a] Podhala [21]).

The early knifelike pains in extramedullary tumor, numbness, paresthesias, motor weakness and involvement of the sphincter, as well as the changes in the cerebrospinal fluid, often make early allocation possible even without the use of iodized poppy-seed oil (Kulenkampf [22]). Pain on coughing or straining and Browne-Séquard's symptoms are very suggestive (Grant [23]), often making myelography dispensable (Lindström [24]). This applies also to compression of the roots caused by scars or thickened ligamenta flava (Towne and Reichert [25]).

Somewhat more difficult is local diagnosis when the damage occurs in the intervertebral foramen. In contrast to the earlier conception of the funicular type of root pain, the tendency is rather to allocate the pain in and about the intervertebral foramen (Putti [1]).

TABLE 1.—*Clinical Analysis of Cases of Pain Low in the Back for 1936*

Diagnosis	Number of Cases	Radiations of Pain			
		Sacrum and Gluteus	Gluteus and Posterior Part of Thigh	Gluteus, Thigh and Leg	Secondary Scoliosis
Arthritis (atrophic and hypertrophic)	142	11	34	40	39
Posterior ligamentous syndrome	114	10	39	41	43
Myofascial syndrome	104	9	30	46	35
Anomalies of the fifth lumbar vertebra	57	4	16	23	18

A number of salient points have been brought out in connection with this problem. The narrowing of the lumbosacral foramen was described first by Danforth and Wilson,[26] who found that the lumbar foramina became increasingly smaller while the nerve roots increased in diameter, the fifth lumbar vertebra being the thickest. Furthermore, there is a natural narrowing by collapse in cases of thinning of the fifth lumbar intervertebral disk (Williams and Yglesias [27]), especially in spondylosis (Lob,[28] Bailey and Casamajor,[29] Janek [30]) and in Bechterew's disease (Höhne [31]).

19. Mixter, W. J., and Ayer, J. B.: Herniation or Rupture of Intervertebral Disk into Spinal Canal, New England J. Med. **213:** 385 (Aug. 29) 1935.
20. Tamaki, K.: Thirty-Nine Extramedullary Tumors of the Spinal Cord, Am. J. Surg. **22:** 397 (Dec.) 1933.
20a. Mixter, W. J., and Barr, J. S.: New England J. Med. **211:** 210 (Aug. 2) 1934.
21. Podhala: Slovanský Sbornik Ortopedicky **10:** 4, 1935.
22. Kulenkampff, D.: Beitr. z. klin. Chir. **159:** 559 (June) 1934.
23. Grant, F. C.: Spinal Cord Tumors, Am. J. Surg. **33:** 89 (Jan.) 1934.
24. Lindström, Nik: Acta orthop. Scandinav. **7:** 86, 1936.
25. Towne, E. B., and Reichert, F. L.: Ann. Surg. **94:** 327 (Sept.) 1931.
26. Danforth, M. S., and Wilson, P. D.: J. Bone & Joint Surg. **7:** 109 (Jan.) 1925.
27. Williams, P. C., and Yglesias, Luis: J. Bone & Joint Surg. **15:** 579 (July) 1933.
28. Lob, Alfons: Deutsche Ztschr. f. Chir. **240:** 441, 1933.
29. Bailey, P., and Casamajor, L.: J. Nerv. & Ment. Dis. **38:** 588, 1911.
30. Janek, J.: Slovanský Sbornik Otopedicky **10:** 5, 1935.
31. Höhne, Christian: Arch. f. orthop. u. Unfall-Chir. **35:** 3, 1935.

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The greatest importance, however, is attributed to the pathologic changes in the intervertebral articulations themselves as the causes and the seat of pain low in the back (Lange [32]), especially in arthritis deformans (Leubner [33]), so frequently seen after the age of 60 (Güntz,[34] Hawley [35]). Ghormley [36] spoke of

TABLE 2.—*Patients with Pain Low in the Back Who Received Injections of Procaine Hydrochloride*

Location of Injection (Site of Tenderness)	Number of Cases	Radiations of Pain: Sacrum and Gluteus	Radiations of Pain: Gluteus and Posterior Part of Thigh	Radiations of Pain: Gluteus, Thigh and Leg	Secondary Scoliosis	Results of Injection: Complete Temporary Relief	Results of Injection: Partial Temporary Relief	Results of Injection: No Relief
1. Posterior superior iliac spine								
Lateral	63	4	20	29	43	47 (74%)	7 (11%)	9 (15%)
Medial	28	2	6	13	15	17 (60%)	6 (21%)	5 (19%)
2. Lumbosacral joint	13	..	4	7	..	8 (61%)	3 (23%)	2 (16%)
3. Transversosacral articulation or impingement	9	1	3	5	4	7 (78%)	1 (11%)	1 (11%)
4. Supraspinous and interspinous ligaments	14	2	8	2	2	13 (93%)	1 (7%)	
5. Lumbodorsal fascia	9	3	2	1	2	8 (90%)	1 (10%)	
6. Combination of 1 and 2	7	1	1	3	..	3 (43%)	1 (14%)	3 (43%)

a regular "facet syndrome," which is expressed not only in sciatic pain but in lumbosacral pain without sciatica. Indeed, this possibility is obvious, though some authorities still deny compression of the nerve root at the point of egress (Ely [37]).

While the origin of root pain within the intervertebral foramen is being more and more accepted in contrast to the funicular origin, we like to point out one anatomic detail which heretofore has found little attention.

Purkinje in 1845 and Luschka [38] in 1850 described what they called the nervus sinuvertebralis, a fine structure receiving a white ramus from the common trunk and a gray ramus from the sympathetic chain just outside the intervertebral foramina. This nerve turns back into the intervertebral canal, and, after having supplied with a costal branch the ligamentum colli costae and the neck and head of the rib, it spreads around the longitudinal vertebral sinus, communicating with the intervertebral veins, the posterior and external venous plexuses and the basivertebral veins (Poirier,[39] Cunningham [40]); the nerve endings go to the pedicles, the interior of the bodies, the loose areolar perimeningeal tissue and the periosteum. As Luschka remarked, they transmit the feelings of spinal irritation, paresthesia, chilling and sensations of heat so often observed with the arthritic spine and yet so seldom seen in cases of sciatic radiation of pain low in the back (fig. 2).

32. Lange, Max: München. med. Wchnschr. **80:** 1134 (July 21) 1933.
33. Leubner, Hugo: Ztschr. f. orthop. Chir. **65:** 42, 1936.
34. Güntz, Eduard: Arch. f. orthop. u. Unfall-Chir. **34:** 333, 1934.
35. Hawley, S. J.: Pennsylvania M. J. **38:** 168 (Dec.) 1934.
36. Ghormley, R. K.: Low Back Pain, J. A. M. A. **101:** 1773 (Dec. 2) 1933; Proc. Staff Meet., Mayo Clin. **6:** 112 (Feb. 25) 1931.
37. Ely, L. W.: Backache; Lumbago and Pain in the Lower Part of the Back, Arch. Surg. **27:** 189 (July) 1933.
38. Luschka, H.: Die Nerven des menschlichen Wirbelkanals, Tübingen, H. Laupp, 1850.
39. Poirier, Paul: Traité d'anatomie humaine, Paris, Masson & Cie, 1896.
40. Cunningham, D. J.: Text-Book of Anatomy, ed. 6, New York, William Wood & Co., 1931.

This point may serve as an argument (as referred to later) that probably more cases are of purely reflex origin and not due to direct compression in the intervertebral canal than is generally accepted.

That sacralization is the sole cause of radiating pain, as assumed by Bertolotti and Rossi, is at least doubtful. However, the formation of a true joint between the fifth lumbar transverse process and the sacrum opens the possibility of transversosacral arthritis (Ingebrigtsen [41]). In several cases of our series such an arthritis could be shown in the roentgenogram, and in three cases removal of the process cured the sciatica.

POSTERIOR SYNDROME

At the outset of our studies we relinquished the classification into the vertical units of the sacrolumbar and the sacro-iliac region for the horizontal units of systems, particularly those represented by the posterior division. This division, comprising the long muscles of the back, their aponeuroses and periosteal insertions and their muscle sheaths and superficial ligaments, indeed forms one physiologic unit. Here belong, aside from the long muscles of the back and their insertions, filling the sacral triangle, the tendinous attachments of the gluteus maximus and the tensor fasciae, as well as the long posterior sacro-iliac ligaments, the ligamentum sacrospinosum, the ligamentum sacrotuberosum and, indirectly, the piriformis. (The last named bears anatomic relations to the sacrotuberous ligament, from which some of its fibers take their origin [Freiberg [42]].) Tension is transmitted to the whole system either by contracture of the muscles of the back (forward flexion test) or by stretching of the hamstrings (Lasègue's sign), and it is significant that Lasègue's sign is negative in cases of true neuritis and in tumor of the cord and positive in cases of fibrositis and myofasciitis of the muscles of the back.

TABLE 3.—*Patients with Pain Low in the Back Treated by Surgical Methods*

Operation	Number of Patients	Radiations of Pain: Sacrum and Gluteus	Radiations of Pain: Gluteus and Posterior Part of Thigh	Radiations of Pain: Gluteus, Thigh and Leg	Secondary Scoliosis	Local Post. Tend.	Operative Results: Good Results	Operative Results: Improvement	Operative Results: No Relief
Tensor fasciotomy (Ober)	10	1	3	6	6	10	6 (60%)	2 (20%)	2 (20%)
Excision of spinal process or ligament	5	..	3	2	1	5	4 (80%)	1 (20%)	
Transversectomy	3	..	1	2	2	3	2 (66%)	1 (33%)	
Stripping of posterior superior iliac spine	3	..	..	3	2	3	3 (100%)		
Sacro-iliac fusion	1	..	1	1	1	..	..	1 (100%)	
Sacrolumbar fusion	5	..	2	2	..	4	4 (80%)	1 (20%)	

One would expect a large portion of cases of low back pain to belong to the posterior syndrome group. First, the pain involves the nearest structure put under strain in cases of trauma and the first one to give under continued stress in the postural and degenerative group. Furthermore, in the absence of definite facts concerning the pathologic process, one can point to analogies for the traumatic and the degenerative arthritis: the posterior syndrome of sprain of the neck muscles, with radiation along the greater occipital nerve; the tennis elbow, a definite localized lesion at the origin of the

41. Ingebrigtsen, R.: Acta chir. Scandinav. **65:** 283, 1929.
42. Freiberg, A. H.: Ohio State M. J. **30:** 21 (Jan.) 1934.

extensor carpi radialis brevis, with radiation down the forearm; the injuries to tendons of the rotators of the arm in subacromial bursitis, with radiation upward to the neck and downward to the forearm into remote dermatomes.

In the majority of cases of posterior musculoaponeurotic or ligamentous involvement, one can locate a definite point of tenderness: in the sacral triangle—posterior superior spine, posterior crest, posterior inferior spine, posterior sacro-iliac ligament, and apex and base at the sacrolumbar joint; lateral from the sacral triangle—the lines of origin of the gluteus maximus, tensor fasciae and greater sciatic notch (fig. 3). Frequently there is diffuse tenderness (hyperesthesia) within the muscle sheath, as distinguished from the point of tenderness of the periosteal ligamentous lesions. Many patients, especially those with a positive Ober sign, show also a superficial midgluteal point of tenderness, not too well defined but in almost all instances associated with a well localized tender point lateral to the posterior superior spine. The gluteus maximus fascia (fascia lata) intimately adheres to the long posterior sacro-iliac ligament, then passes upward to the posterior superior spine and the crest of the os ilei. Before reaching the crest it takes a secure attachment (with most of its fibers) to the superior gluteal ridge. It is here that the lesion seen on the lateral aspect of the posterior superior spine may be located.

There is a syndrome involving the deep posterior division, that is, the deeper ligamentous structures of the sacro-iliac junction, the iliolumbar ligament and also the transverse sacral process in cases of sacralization. These structures are supplied totally or in part by the posterior division of the lumbosacral region (Pitkin and Pheasant [43]). They do not, however, produce the circumscribed pressure points which the more superficial lesion does. On the other hand, the signs referable to the leg become of greater importance, as they may be the only means of eliciting indirectly local tenderness of the deeper structures. So we find such signs indispensable both for the superficial and for the deeper local lesion in the territory of the posterior division, but they are not pathognomonic for any definite localization (Brahdy [44]). Stress transmission by rotation of the os ilei forward (the Nachlas [45] sign) or backward (Lasègue) occurs over a multitude of structures; the identification of the particular structure involved rests with the local point of tenderness. The Lasègue sign indicates stress transmitted through the hamstrings to the sacrospinalis, the fascial sheath and the posterior sacro-iliac ligamentous apparatus, as well as tension to the sacrotuberous and the sacrospinous ligament. This fact may explain the pressure effect of the piriformis on the sciatic trunk (Freiberg and Vinke [46]). Nutter [47] expressed the opinion that the constant absence of internal crural involvement seems to preclude direct pressure on the nerve (Pitkin and Pheasant [48]). The neck flexion reaction (Soto-Hall [49]) is not found in cases of injury to soft tissue.

In examining the gluteus maximus and medius at their origin from the posterior superior spine, we found nerve filaments running from the posterior superior spine into the muscle. What part do they play in the gluteal syndrome? Apparently they transmit pain and tenderness laterally and distally from the lesion in the posterior superior spine. Also, many fibers of the gluteus maximus take their origin from the long posterior sacro-iliac ligament; so it is possible that the pull on the gluteus maximus muscle irritates the original point of lesion at the long posterior sacro-iliac ligament.

The Ober sign [50] denotes contracture of the tensor fasciae. At its lateral border the fascia splits to enclose the gluteus maximus, separating it from the gluteus medius, as can easily be shown by injecting

M splenius capitis et cervicis (reflected)
Ramus posterior n. cervicalis II
ramus medialis
ramus lateralis
M semispinalis capitis
N. occipitalis major
N. occipitalis tertius
M. trapezius
Proc. spinosus vertebrae thoracalis I
Ramus cutaneus of the ramus posterior n. cervicalis VII
Ramus medialis of the ramus posterior n. thoracalis I
Ramus cutaneus medialis of the ramus posterior n. thoracalis I
M. longissimus dorsi
M. iliocostalis dorsi
M. semispinalis dorsi
Ramus posterior n. thoracalis VI
Ramus cutaneus lateralis
Ramus cutaneus medialis
of the ramus posterior n. thoracalis VII
M. latissimus dorsi
Proc. spinosus vertebrae thoracalis XII
Ramus lateralis of ramus posterior n. thoracalis XII
Ramus lateralis of ramus posterior n. lumbalis I
Ramus posterior of the ramus cutaneus lateralis n. intercostalis XI
Ramus cutaneus of the ramus posterior n. thoracalis XII
Rami cutanei laterales of the rami posteriores nn. lumbalium nn. clunium superiores
Rami cutanei mediales of the rami posteriores nn. lumbalium
Rami posteriores nn. sacralium
M. gluteus maximus

Fig. 1.—The posterior divisions of the spinal nerves (from Spaltholz, Werner: Atlas of Human Anatomy, Philadelphia, J. B. Lippincott Company).

air under the fascia lata. We find that the superficial layer of this inclosing fascia has a short aponeurotic attachment to the superior gluteal ridge, to which the long posterior sacro-iliac ligament likewise attaches; hence the impossibility of isolating stress to either one of these structures. The "standing" Ober sign is the limitation of adduction of the leg or inability to cross it and denotes contractural posture rather than an original point of the disease.

Interspinous impingement is not uncommon in the sacrum acutum, with pre spondylolisthesis and in the long and the broad spinous processes. Baastrup [51] described impingement of the spinous process with formation of nearthroses, flattening of processes and osteosclerosis. Avulsion fractures of the spinous processes have been described (Wachs [52]) with pseudoarthroses

43. Pitkin, H. C., and Pheasant, H. C.: Sacrarthrogenetic Telalgia: II, J. Bone & Joint Surg. **18:** 365 (April) 1936.
44. Brahdy, Leopold: Mechanics of Physical Signs of Lower Trunk Injuries, Surg., Gynec. & Obst. **60:** 802 (April) 1935.
45. Nachlas, I. W.: Knee Flexion Test for Pathology in Lumbosacral and Sacro-Iliac Joints, J. Bone & Joint Surg. **18:** 724 (July) 1936.
46. Freiberg, A. H., and Vinke, T. H.: J. Bone & Joint Surg. **16:** 126 (Jan.) 1934.
47. Nutter, J. A.: Canad. M. A. J. **35:** 11 (July) 1936.
48. Pitkin, H. C., and Pheasant, H. C.: Sacrarthrogenic Telalgia: II, J. Bone & Joint Surg. **18:** 365 (April) 1936; III, **18:** 706 (July) 1936. Pitkin, H. C.: IV, **18:** 1008 (Oct.) 1936.
49. Soto-Hall, Ralph, and Haldeman, K. O.: Surg., Gynec. & Obst. **61:** 827 (Dec.) 1935.
50. Ober, F. R.: J. Bone & Joint Surg. **18:** 105 (Jan.) 1936.
51. Baastrup, C. I.: Fortschr. a. d. Geb. d. Röntgenstrahlen **48:** 430 (Oct.) 1933.
52. Wachs, Emil: Fortschr. a. d. Geb. d. Röntgenstrahlen **52:** 261 (Sept.) 1935.

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and arthritic bridges. All these lesions may give rise to severe compression of the interspinous ligament and produce strictly localized points of pressure.

POSTURE

Buchholz [53] gave the incidence of sciatic scoliosis as 22.7 per cent and the ratio between homolateral and contralateral curvature as 30:67. On the other hand, Pitkin gave the incidence of heterolateral curvature as 45 per cent and of homolateral curvature as 47 per cent and observed no list in only 8 per cent of his patients. We cannot agree that sacralgic telalgia is always accompanied by scoliosis, as we have seen many patients without list. Nor have we been able to observe a characteristic pattern to differentiate sacral and iliac "slip" (Pitkin). In the majority of cases the spine is shifted to the side opposite the lesion; i. e., with the lumbar convexity at the side of the lesion and the thoracic

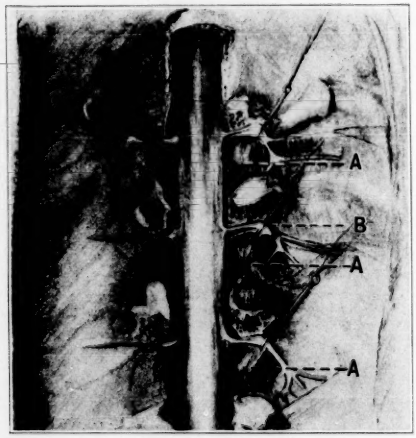

Fig. 2.—Dissection of the nervus sinuvertebralis, lower dorsal and upper lumbar regions: *A*, nervus sinuvertebralis; *B*, dorsal root ganglion.

list on the opposite side. This lowers the pelvis on the affected side, placing the hip in adduction. We believe that in patients with a positive Ober sign the contracture is secondary to the scoliosis and the accompanying drop of the pelvis, the syndrome persisting because of the resulting tension.

PROCAINE HYDROCHLORIDE TEST

Recognizing that this triad of symptoms, namely, local tenderness, radiation and faulty posture, must apply for the posterior as well as for the anterior division syndrome, our objective was first to single out from a series of 451 patients seen in the last fifteen months those in whom a definite localized source of pain was found by palpation and in whom the leg signs consistently referred to this localized tender point. The structures involved are all supplied by the posterior division of the spinal nerves. We next tried to establish the relation of this local point to radiation.

The test is made by injecting into the area of local tenderness from 5 to 10 cc. of a 1 per cent solution of procaine hydrochloride. The point is first marked by a silver nitrate stick, and the skin over it is anesthetized with a few drops of the procaine solution. Then the needle is inserted deeply and the involved tissue identified by a definite sensation of pain when the point of the needle comes in contact with it. Sometimes the operator has to feel his way until he strikes this point.

Five postulates must be met to furnish proof that a causal connection exists between local pain and radiation:

1. Contact with the needle must aggravate the local pain.
2. Contact with the needle must elicit or aggravate radiation.
3. Procaine hydrochloride infiltration must suppress local tenderness.
4. Procaine hydrochloride infiltration must suppress radiation.
5. The positive leg signs must disappear.

When all five requirements were met, we considered that the patient reacted positively to the test and that the radiation was a reflex phenomenon elicited by the local lesion.

For this series only patients were used who were seen in the fifteen months after the study began. Excluding 142 patients with arthritis or the combined anterior and posterior division syndrome, we found deep ligamentous injuries in 114 and myofasciitis in 104 (Albee [54]), a total of 228. When we further eliminated patients in whom there was no primary definite localization, for instance, in postural cases, there remained 145, or about 30 per cent, who definitely showed the posterior division syndrome and in whom we suspected that the radiation was a reflex and not a root compression phenomenon (table 1).

It is shown in table 2 that the positive responses, arranged according to primary source of pain (pressure point), were as follows: posterior superior spine, lateral, forty-seven, 74 per cent; posterior superior spine, medial, seventeen, 60 per cent; lumbosacral junction, eight, 61 per cent; transversosacral articulation, seven, 81 per cent; supraspinous and interspinous ligaments, thirteen, 93 per cent, and lumbodorsal fascia, eight, 90 per cent. That is, 100 of 145 patients, about 70 per cent, gave a positive response.

These figures represent a minimum percentage. It is likely that some cases were missed because the involved area was not closely enough identified by the inserted needle. Sometimes a good deal of testing is needed before the exact point reveals itself by definite pain and aggravation of the radiation.

TREATMENT OF THE POSTERIOR SYNDROME

Although the question of treatment is beside the scope of this paper, we believe that from the establishment of a definite posterior division syndrome for pain low in the back certain therapeutic inferences may be drawn:

1. It may be expected that the strains of the muscular aponeurotic structures will yield to conservative treatment by immobilization and physical therapy in a manner similar to that in which strains of these structures yield in other locations of the body. Of the 142 patients with the posterior division syndrome, 103 were treated satisfactorily by conservative methods. This is more than the number of positive responses, which shows that in some cases positive responses should have been obtained but were missed because of insufficient testing with procaine hydrochloride.

53. Buchholz, C. H.: Am. J. Orthop. Surg. **10**: 528 (May) 1913.

54. Albee, F. H.: Am. J. Surg. **23**: 70 (Jan.) 1934.

2. Of the remaining thirty-nine patients who did not yield to conservative treatment, nine with coccygodynia and pain low in the back were eliminated, leaving thirty patients with low back pain to be treated surgically (table 3).

The reasons why they did not yield to immobilization were threefold:

1. Persistence of aponeurotic tension. Ten patients had Ober's operation; 60 per cent were cured and 20 per cent improved. Three had stripping of the posterior superior iliac spine; all were cured.

2. Pinching or impingement of soft structures. On five patients with impingement of the interspinous ligament, resection of the spinous processes was performed; 80 per cent were cured and 20 per cent improved.

3. Inability to immobilize. A palliative operation of internal fixation was performed on six patients by sacro-iliac and sacrolumbar fusion; 67 per cent were cured and 33 per cent improved.

REPORT OF CASES

CASE 1.—*Sacrospinalis syndrome.* In B. S., aged 21, admitted Feb. 11, 1937, the acute onset February 3 followed a fall. There were tenderness in the medial aspect of the right posterior superior spine and radiations to the posterior part of the right thigh. Leg signs were positive on the right. The spine was straight.

Procaine hydrochloride was injected into the medial part of the right posterior superior spine. Radiations were reproduced by the touch of the needle. Relief lasted two hours, the motions being normal and the leg signs negative. The condition was cured by support.

CASE 2.—*Supraspinous and interspinous ligament syndrome.* In M. M., aged 34, admitted Dec. 28, 1931, the onset was sudden eleven years before after a fall. There was tenderness in the supraspinous ligament of the fourth and fifth lumbar vertebrae. The radiations were bilateral but worse on the right, going down to the heels and the posterior part of the thigh and leg. Leg signs are mildly positive on the right with straight leg raising (hyperextension of the spine caused severe pain).

Procaine hydrochloride was injected at the site of tenderness in the supraspinous and interspinous ligaments of the fourth and fifth lumbar vertebrae. Radiations were reproduced by needle touch. All local and radiating pain was relieved for two hours, and hyperextension of the spine was painless.

Conservative treatment was of no avail. March 6, 1937, excision of the impinging points of the fourth and fifth lumbar vertebra was done. Complete relief followed.

CASE 3.—*Lumbosacral joint syndrome.* In E. V. H., aged 35, admitted April 17, 1936, the onset in December 1935 was insidious. There was tenderness in the left lumbosacral joint and the coccyx. Leg signs were positive on the left. The spine was straight. There were radiations, not severe, down the posterior part of the right thigh, the lateral aspect of the left leg and the posterior part of the right thigh.

The first two injections of procaine hydrochloride were superficial and gave little relief. The third injection was at the level of the left lumbosacral joint and gave relief for about an hour. Radiations were reproduced by the point of the needle and then relieved. Leg signs were negative after the injection. X-ray examination showed a transverse defect in the inferior articular process of the fifth lumbar vertebra.

No relief was obtained by conservative means, and May 8, 1937, lumbosacral fusion was done.

CASE 4.—*Lumbodorsal fasciitis syndrome.* In R. J., aged 38, admitted March 12, 1937, the onset was sudden one year previously while he was lifting. There were no radiations. The tenderness was superficial and to the left of the fifth lumbar vertebra. Leg signs were negative. The spine was straight.

On injection of procaine hydrochloride, there was first hyperesthesia of the fascia at the site of tenderness (the point of the needle caused severe pain) then complete relief was obtained for two hours. The mobility of the spine was normal after the injection. The roentgenograms revealed nothing abnormal. The patient was treated by physical therapy.

CASE 5.—*Gluteal myofascial syndrome.* In V. R., aged 43, admitted Aug. 17, 1936, the onset was insidious ten months before. There was tenderness over the lateral aspect of the right posterior superior spine and the right midgluteal point, with radiations down the posterior part of the right thigh and the lateral part of the right leg and foot. Leg signs were positive on the right, except Lasègue's sign. The spine shifted slightly to the left.

On injection of procaine hydrochloride at the lateral aspect of the right posterior superior spine, radiation was reproduced by needle touch; then for two hours relief of radiation and local symptoms. Motions became normal and the leg signs negative. Posture became normal.

No relief was obtained by conservative treatment. March 11, 1937, the lateral aspect of the right posterior superior spine was stripped. The operation gave complete relief.

CASE 6.—*Gluteal myofascial syndrome.* In W. E., aged 21, admitted in November 1936, the onset had been insidious. The tenderness was well localized lateral to the right posterior

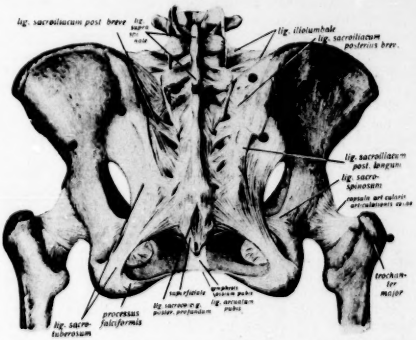

Fig. 3.—The common pressure points of the superficial structures of the lower part of the back.

superior spine. There were radiations down the posterior part of the right thigh and the lateral part of the right leg and foot. Leg signs were positive on the right, except Lasègue's sign.

Needle touch reproduced radiation at the lateral aspect of the posterior superior spine on injection of procaine hydrochloride. The leg signs became negative, and the local and the radiating pain was temporarily relieved. The condition was relieved by support.

CASE 7.—*Acute gluteal myofascial syndrome.* In R. B., aged 35, admitted March 26, 1937, the onset was acute; the patient was seen four hours afterward. The tenderness was well localized just lateral and superior to the left posterior superior spine. There were radiations down the posterior part of the left thigh, and the leg signs were markedly positive on the left, except Lasègue's sign. The patient could hardly move because of pain.

Procaine hydrochloride, 3 cc. of a 1 per cent solution, injected at the tender point, lateral to the left posterior superior spine, reproduced the radiations well. Relief lasted several hours, and the leg signs became negative. The patient was amazed at the spectacular relief. The injection was repeated daily for three days, and cure followed in about one week.

CASE 8.—*Transversosacral arthritic syndrome.* In W. A., aged 18, admitted Aug. 22, 1935, the onset at the age of 12 had been insidious. The tenderness was over the left transversosacral point. Radiations down the posterior part of the

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left thigh and leg were severe. Leg signs were positive on the left. The spine showed a marked shift to the right with left lumbar, right dorsal scoliosis.

Procaine hydrochloride was injected at the left sacralized transverse process. The radiations were reproduced by the needle. Relief lasted one hour, with full motion of the spine, improvement of the posture and disappearance of the leg signs.

Conservative treatment gave no relief. A left transversectomy performed March 2, 1937, gave relief.

CASE 9.—*Left transversosacral arthritis; bilateral sacralization of the transverse processes.* In B. H., aged 21, admitted Feb. 17, 1937, the onset three months before had been gradual (back "always weak"). The pain was worse in the morning, with changes of weather and after exercise. There were tenderness directly over the left transversosacral joint and radiations down the posterior part of the left thigh. Leg signs were positive on the left. The spine showed a slight shift to the right, with left lumbar, right dorsal scoliosis.

Procaine hydrochloride was injected at the level of the left transversosacral point. Radiations were reproduced by the point of the needle. Relief from radiating and local symptoms was obtained for about one hour, the leg signs became negative, and the posture was improved.

The condition was treated by a brace. The patient was relieved but unable to work.

CASE 10.—*Tensor fascial syndrome; Ober operation.* In M. G., aged 48, admitted Sept. 20, 1929, the sudden onset followed wrenched back. There was tenderness over the lateral aspect of the left posterior superior spine and the left midgluteal point. There were radiations down the posterior part of the left thigh. The Ober and the straight leg raising sign were positive on the left. No procaine hydrochloride was injected.

No relief was obtained from conservative treatment. Dec. 5, 1934, lumbosacral and sacro-iliac fusions were performed, but they gave no relief. Feb. 2, 1936, a tensor fasciotomy was done. The tensor fascia was very tight, almost bony hard when tense. The separation was about 2 inches when sectioned. This operation gave relief, and the patient does hard work.

CASE 11.—*Tensor fasciae syndrome; Ober operation.* In J. B., aged 46, admitted Dec. 13, 1934, the onset had been sudden four years previously after a short fall. There were tenderness lateral to the right posterior superior spine and at the right midgluteal point and radiations down the posterior part of the right thigh. Leg signs were positive on the right; Ober's sign was positive on the right.

Procaine hydrochloride injected lateral to the right posterior superior spine relieved the radiations and the local pain for two hours.

No relief was obtained from conservative treatment. An Ober fasciotomy gave relief (the patient had tight fascia). The patient has occasional pain, not severe, lateral to the posterior superior spine.

COMMENT

We believe that the allocation of the source of pain due to disorders low in the back offers a distinct advantage for the management of the disorder. This allocation is thoroughly feasible in the large number of cases in which the trouble involves structures supplied by the posterior division of the spinal nerves, because the seat of pain is either accessible to the palpating finger or reveals itself by transmission through the leg test or both. We have attempted to show by the procaine hydrochloride test that both local pain and radiation are in causal connection and that radiation may be elicited by an area of local pain as a reflex symptom without being caused by root compression. This theory does not by any means reject true root compression neuralgias as they occur with arthritis or with special pathologic conditions of the lumbosacral level. We merely furnished proof that in the large group of cases of the posterior division syndrome such radiation is a reflex phenomenon, because it can be suppressed together with the local pain by the injection of procaine hydrochloride.

ABSTRACT OF DISCUSSION

DR. WILLIAM BARNETT OWEN, Louisville, Ky.: The authors' attempt to differentiate pathologic conditions in the territory of the posterior from those in the territory of the anterior lesions of the lumbosacral process is most interesting. It appears that they have had a sufficient number of cases over a period of time to reach certain definite logical conclusions. Any clinical or therapeutic test that helps to localize more definitely the origin of the pathologic condition represents a substantial step forward in the final successful outcome in the case. Take for instance a triple arthrodesis; i. e., fusion of both sacro-iliac joints and the lumbosacral joint for pain low in the back. That is a procedure that is seldom, if ever, justifiable. It is like shooting at a target with a 10 gage shot gun instead of a rifle. One is hoping that one of the shot may strike the pathologic condition. In other words, it is more important to take a great deal of time and study to make a definite localization before any radical procedure has been instituted. In the meantime, one should continue with conservative treatment, as the authors have shown. A very large percentage of all pain in the lower part of the back can be relieved by rest, support, postural training and the usual conservative methods. There have been many valuable contributions in the past ten or fifteen years on low back pain. I feel that we have begun to learn something. The more we learn for certain, the less will be written. Take, for instance, typhoid, smallpox and diphtheria. There is much known for certain about these diseases, so the journals have had a rest. I feel that the authors have made a distinct contribution. I am sure that if we intelligently employ the procaine localization test, it will greatly assist in making a diagnosis.

DR. A. R. SHANDS JR., Durham, N. C.: The authors have presented a new approach to the diagnosis of one of the most puzzling of orthopedic problems. Many physicians have known for a long time that the differential diagnosis of disorders in the lower part of the back have not been accurate. Discarding the old horizontal classification of sacro-iliac and lumbosacral disorders for a vertical classification of anterior and posterior spinal nerve areas is a distinct innovation. The authors have given an excellent analysis of the nerve supply to the muscles in the lower part of the back. The five postulates which they lay down in the proof of the connection between the local site of tenderness and radiating pain are most important and necessary for the correct diagnosis. The figure of 70 per cent positive responses in 142 cases of posterior nerve division is impressive and should convince the doubtful mind that the procedure is sound. Even though they do not go far into the treatment of these disorders, it is certainly most gratifying to hear that 72 per cent of these posterior division cases yielded to the conservative measures of physical therapy and immobilization. It is assuredly true that during the last ten years we have passed through an operative period for pain in the lower part of the back. Many are beginning to realize the futility of some of these procedures and are finding that many of these low back patients who have been operated on remain unimproved. Some of the most dramatic operative results for the relief of low back and radiating pain that I have ever seen were ten years ago following a Smith-Petersen sacro-iliac arthrodesis. How many of these are still relieved of pain cannot be said, but no doubt there have been many recurrences. Dr. Ober and now Drs. Steindler and Luck have well demonstrated that stripping the fascia lata from its posterior iliac attachment, which is done in his sacro-iliac arthrodesis, is probably the real reason these patients are relieved of the pain. During the past wave of lumbosacral and sacro-iliac fusions, I am convinced that too much attention has been paid to these joints and not enough attention to the impingement of the transverse processes on the sacrum and ilium, and the impingement of the spinous processes on one another. Drs. Steindler and Luck, in their localization with procaine, have demonstrated the true pathologic condition in many of these cases. I believe that physicians would all do well to think more carefully along the lines that the authors

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have outlined and attempt to localize the lesion before proceeding with treatment in low back pain syndromes.

DR. ARTHUR STEINDLER, Iowa City: I have nothing more to say except to thank the discussers, particularly since we consider this paper merely a study in diagnosis and not a study in treatment. We have been forced to admit that sciatic pain in a large percentage of cases has nothing to do with organic compression of the sciatic nerve but is transmitted through a reflex nerve passage probably going through the spinal cord. The important part is that when one has established a causal connection between a local peripheral lesion and what appears to be sciatica there is no use of looking up the nerve tract of the sciatic trunk or the sciatic roots. Particularly I think we shall have to break sooner or later with the idea of local compression of the funicular or radicular type, at least for a certain number of those cases in which this particular pathologic condition was accused of being the underlying cause.

TENDOPLASTIC AMPUTATION THROUGH THE FEMUR AT THE KNEE

FURTHER STUDIES

C. LATIMER CALLANDER, M.D.

SAN FRANCISCO

A year and a half has elapsed since this tendoplastic amputation through the femur at the knee was introduced in THE JOURNAL.[1] A sufficient number of additional cases are available to warrant a resurvey of the factors presented in the initial paper. Experience at the University of California Surgical Division of the San Francisco Hospital and that of co-workers and surgeons elsewhere have suggested some slight changes in technic. With data on operative indications, matters of technic and points of criticism, this paper brings the status of this amputation through the femur up to date.

In the Surgical Section of the Exhibit Hall there was an exhibit of surgically planned dissections, mounted for permanent preservation by a method devised by two associates, Dr. J. M. Saunders and Dr. A. H. Rice of the University of California Medical School and executed by our technical assistant, Mr. Rudolph Skarda. This paper is illustrated by photographs of the operative stages, which may be compared with the detailed halftone drawings in the original paper.[1]

After repeated personal experience with the surgical principles embodied in this operation, and discussion of these principles with many surgeons over the country at large, I believe we are justified in maintaining this type of operation in our surgical armamentarium.

The essentials of the operation are given in summary. The details of the operative procedure are presented, with the changes and additions indicated by recent experience. The features of this procedure are contrasted with those of other types of amputation in the lower third of the femur.

SYNOPSIS

Briefly, the operation is performed as follows: The anterior flap is fashioned from the soft tissues of the upper part of the leg as far distally as the level of the tibial tuberosity; the posterior flap is longer than the anterior, and it extends well down on the gastrocnemius muscle. The popliteal vessels and nerves are ligated through an amuscular and avascular cleavage plane on the medial aspect of the lower part of the thigh. All the hamstring muscles are severed at their tendinous insertions on the tibia, and the femur is sectioned in the condylar flare just proximal to the adductor tubercle. The patella is dissected from the anterior flap from the joint side, leaving the rectus femoris tendon in the floor of the patellar fossa to act as an end-bearing buffer for the femur. No coapting primary sutures are used, save from four to six skin clips or sutures to hold the flaps roughly in position.

As the edges of the flaps unite, the posterior flap retracts gradually but extensively until the femur occupies the patellar fossa snugly, and the suture line is located well up behind the stump end.

DESCRIPTION OF OPERATION

The patient is placed in the dorsal decubitus position, the knee of the affected extremity is flexed slightly and the leg is elevated a little above horizontal on one or two sandbags. No tourniquet is applied. The surgeon stands on the side opposite the affected extremity and faces the medial aspect of the thigh and knee to be operated on. He maintains this position throughout the operation, because the essential steps are directed through a medial approach to the popliteal space. The operative work on the lateral aspect of the lower part of the thigh and knee is accomplished readily by rotating the knee medially.

The incisions in the skin outlining the slightly unequal anterior and posterior flaps coincide with the

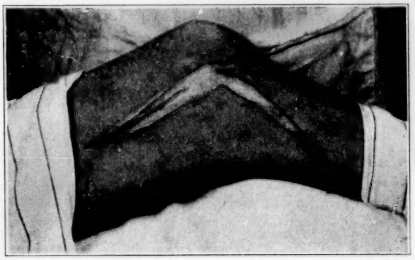

Fig. 1.—Medial surface of the left thigh and knee, showing skin incisions on the medial side of the lower part of the thigh and the knee, marking the long anterior and posterior flaps. Attention is directed to the amuscular and avascular interspace between the vastus medialis and the sartorius muscles. The flaps for this amputation are derived partly from the soft parts of the leg.

incisions that cover all the deeper soft parts (fig. 1). The incision on the medial aspect of the thigh begins at a point three fingerbreadths proximal to the most prominent part of the medial femoral condyle and runs horizontally distally in the palpable groove between the vastus medialis and the sartorius muscles. With the knee in partial flexion this groove can be defined readily. After the incision has been deepened to the enveloping or deep fascia of the thigh, the adductor tubercle of the medial femoral condyle and the tendon of the adductor magnus muscle, which inserts on it, can be palpated. The incision in the skin continues distally over the medial epicondyle, sweeps forward and crosses the anterior surface of the tibia at the anterior tibial tuberosity, the point of insertion of the quadriceps extensor tendon.

From the University of California Surgical Division of the San Francisco Hospital.

Read before the Section on Surgery, General and Abdominal, at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1937.

1. Callander, C. L.: A New Amputation in the Lower Third of the Thigh, J. A. M. A. **105**: 1746-1753 (Nov. 30) 1935.

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The thigh then is rotated medially (i. e., toward the surgeon). The incision on the lateral aspect of the leg begins at a point three fingerbreadths proximal to the lateral femoral condyle in the palpable groove between the tendon of the tensor fasciae latae (iliotibial tract) and the biceps femoris muscles. This incision must overlie and split the tensor fasciae latae tendon in order to avoid the muscle fibers of the biceps. Continuing distally over the lateral epicondyle, the incision extends forward to meet the medial incision at the anterior tibial tuberosity, thus outlining the anterior flap of the amputation.

Corresponding incisions from each femoral epicondyle are carried obliquely posteriorly and inferiorly until they meet on the calf of the leg at a point considerably inferior to the level of the anterior tibial tuberosity, at about the midpoint of the belly of the gastrocnemius muscle. This incision for the posterior flap is deepened to the fascia on the gastrocnemius muscle. Thus are outlined two long amputation flaps, the posterior a little longer than the anterior. Each flap partakes not only of the soft parts of the lower thigh but of a considerable portion of the soft parts of the leg.

Attention is then centered again on the medial aspect of the thigh and knee. The horizontal portion of the medial incision, common to the two flaps (i. e., that portion lying between the vastus medialis and the sartorius muscles) is deepened through the deep fascia of the thigh (fig. 2 *A*). Division of this powerful fascial layer, which is the only strong structure in the medial wall of the popliteal fossa at this level, affords ingress to the popliteal space. The left forefinger, now inserted into the superficial popliteal space, by blunt dissection frees the medial hamstring tendons as far as their tibial insertions. At this juncture these tendons are divided in the order named: sartorius, gracilis, semimembranosus and semitendinosus (fig. 2 *B*). During this dissection, no fleshy portion of any of the medial hamstring muscles nor any part of the vastus medialis muscle need be exposed, much less severed. The severed hamstring tendons retract at once into the aponeurotic and areolar tissue of the posterior flap and are not dealt with again. Further exposure is gained by severing the tendon of the adductor magnus muscle at its attachment to the adductor tubercle. Free access to the basculoneural contents of the popliteal space thus is afforded (fig. 2 *C*). Moderate flexion of the knee relaxes the popliteal vessels and nerves and favors their manipulation. With a finger now inserted more deeply into the popliteal space and kept close to the posterior surface of the femur, the popliteal artery and vein are withdrawn easily to a level flush with, or even outside of, the incision in the skin (fig. 3 *A*).

Fig. 2.—Medial surface of the left thigh and knee (only insertions of these tendons should be exposed at operation): *A*, the medial vastus muscular compartment has been opened only to show its contents. Three of the four hamstring tendons have been dissected to show their course and insertion. The sartorius tendon has been cut and reflected with the posterior flap. Attention is directed to the tendon of the adductor magnus muscle, inserting on the adductor tubercle. *B*, a finger is inserted into the popliteal space and has bunched the medial hamstring tendons prior to severing them at their tibial attachment. *C*, the medial hamstring tendons have been divided at their tibial insertion and can be seen in the posterior flap. The popliteal artery and vein are exposed.

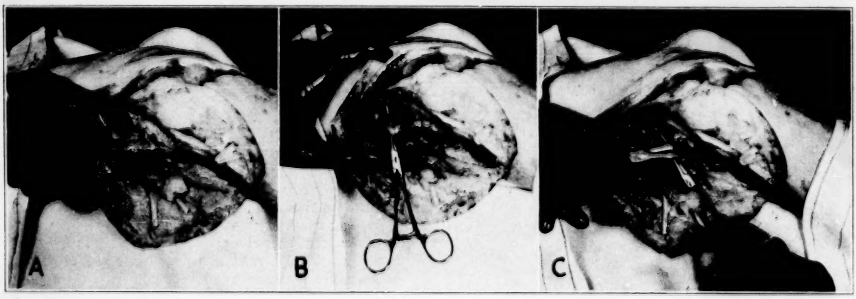

Fig. 3.—Medial surface of the left thigh and knee: *A*, the popliteal artery and vein are withdrawn from the fossa prior to ligation. *B*, the popliteal artery and vein have been ligated. The popliteal termination of the sciatic nerve has been drawn from the depths of the popliteal space preparatory to anesthetization, ligation, division and injection with absolute alcohol. *C*, the sciatic nerve has been doubly ligated proximal to its division into the popliteal and common peroneal branches.

Here they are clamped, ligated and divided as far distally in the popliteal space as possible. The tibial (internal popliteal) and common peroneal nerves are then drawn readily into the wound as one trunk and are anesthetized, ligated and divided (fig. 3 *B*). Each of the components of the nerve bundle then is injected with absolute alcohol to prevent formation of neuroma, and the stump is allowed to retract into the proximal recess of the popliteal space (fig. 3 *C*). Ligation of these three essential structures low down in the popliteal space prevents unnecessary separation of the posterior flap from the femur and minimizes formation of dead space.

The partly flexed knee then is rotated toward the operator, and the lateral longitudinal incision is deepened through the more posterior fibers of the tensor fasciae latae tendon (fig. 4 *A*). This incision is carried inferiorly as far as the insertion of the biceps muscle on the head of the fibula, where the biceps tendon then is severed (fig. 4 *B*). At this stage of the operation the popliteal space may be opened widely from side to side, since the essential structures have been divided. Deepening of the incision outlining the posterior flap down to the gastrocnemius aponeurosis, and clearing from it the areolo-adipose débris, free the posterior flap. It is advantageous to leave as much as possible of the fibro-areolar tissue of the popliteal space

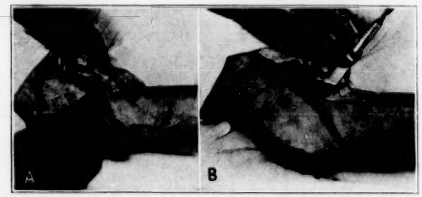

Fig. 4.—The lateral surface of the left thigh and knee: *A*, the knee has been rotated medially (toward the operator). The biceps muscle and tendon are isolated prior to section of the muscle at its insertion on the head of the fibula. *B*, the knee is rotated medially toward the surgeon. The biceps tendon has been severed. The knife blade elevates the common peroneal nerve, which already has been sectioned in the medial approach (fig. 3 *C*).

in contact with the femur as far distally as the level of the adductor tubercle in order that there may be but little dead space between the posterior flap and the femur.

The knee then is extended and the incision marking the distal portion of the anterior flap is deepened through the capsule of the knee joint down to the femoral condyles and to the tibia, thereby severing the quadriceps tendon at its insertion into the tibial tubercsity. The anterior flap, containing the patella, is dissected upward off the infrapatellar fat pad and drawn upward on the thigh until the superior synovial recesses of the subquadriceps space are seen (fig. 5 *A*). The patella is dissected from the apex to the base from its sesamoid position in the quadriceps tendon, care being taken to preserve the longitudinally disposed tendon of the rectus femoris muscle, which runs over it (fig. 5 *B*). Preservation of this tendon adds materially to the end-bearing capacity of the stump after the cut end of the femur is fitted into the socket from which the patella has been removed. The synovia on the anterior flap and on the femur proximal to the condyles is not excised. The femur now is sawed through its cancellous portion just proximal to the adductor tubercle (fig. 6 *A*). At this level the shaft of the femur corresponds in size to the patellar socket in the quadriceps tendon (fig. 6 *B*). The cut end of the femur is rounded with a bone-cutting forceps and a rasp until no sharp surfaces and no fringes of periosteum remain.

The two large flaps are inspected for small bleeding points. These can be ascertained best by sluicing the surfaces of both flaps with large quantities of warm

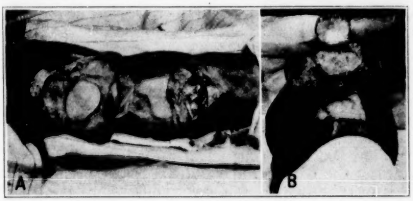

Fig. 5.—Anterior surface of the left thigh and knee: *A*, the anterior flap has been fashioned and turned upward. Note that the fat pad is dissected from the anterior flap. *B*, the anterior flap has been fashioned and turned upward and the patella dissected from its fossa from the base toward the apex of the bone. It is easier to dissect it from the apex to the base. Note the longitudinally disposed fibers of the rectus femoris tendon in the floor of the patellar fossa after removal of the sesamoid patella.

salt solution. The flushing has the additional advantage of washing away any soft tissue or bone débris. Many small bleeding points may require ligation after this procedure. Inspection of the body of the posterior flap shows no muscle fibers. It does show areolo-adipose tissue and the cut ends of the hamstring tendons which already are retracted into their aponeurotic beds and scarcely are visible. The flaps now are allowed to fall loosely together (fig. 7 *A*).

The coaptation suturing during the operation is limited to the placing of six or eight clips or sutures at such intervals as to keep the flaps in fair apposition. When the edges of the skin are approximated, the aponeurotic edges also lie in contact; mere apposition is sufficient to produce firm union. None of the tendons or aponeuroses of the anterior flap are sutured to the corresponding structures of the posterior flap. In this way no structure is under any tension, and the trauma and consequent pressure necroses which result

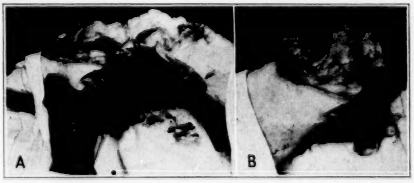

Fig. 6.—*A*, medial surface of the left thigh and knee. The anterior flap, from which the patella has been dissected, is turned upward. The sawline in the femur, just proximal to the adductor tubercle, is indicated. *B*, medial aspect of the amputation. When the anterior flap is turned down, the patellar fossa will overlie the cut end of the femur.

from suture of these deeper structures cannot occur. The flaps appear exceedingly long and even extend one or more inches beyond the end of the femur immediately after they are fashioned. To the surgeon accustomed to the routine type of amputation in the lower third of the femur, the flaps appear excessively redundant and clumsy and arouse suspicion that a bulbous stump end and large dead spaces will result. When

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he notes how wobbly the femur lies between the flaps, he questions whether the end will gain contact with the patellar socket and fuse there. As early as the second or third postoperative day and sometimes even within a few hours after the operation, the reason for leaving these flaps under no tension becomes apparent, as the hamstring muscles, severed only at their distal attachment, contract to the degree that the cutaneous suture line lies posteriorly at about the level of the stump end, and the femur is felt in the patellar fossa (fig. 7 *B*).

POSTOPERATIVE CONVALESCENCE

After the operation the stump is wrapped snugly in a gauze roll on a short splint, and the patient is returned to bed. He is able to sit upright in bed in the evening of his operative day and can be placed in a wheel chair during the next day or two. Daily dressings are required because an abundant serosanguineous oozing between the edges of the skin takes place for several days in spite of the most meticulous hemostasis. The drainage gradually lessens. The absence of primary suturing, other than that necessary for approximation of the flaps, minimizes the pocketing accumulation of soft parts of the stump (fig. 8). There is excellent end bearing, because of the presence of the rectus femoris tendon, the elements of the prepatellar bursa and tough skin over the end of the bone. The patient can extend his stump powerfully, a requisite in any amputation in the thigh.

COMMENT

Objections to certain features of the older types of amputation in the thigh led to an attempt to synthesize an operation which would minimize the difficulties. The operation described has embodied a new application of surgical and anatomic principles.

Vascular Considerations.—The customary use of a tourniquet is purposely omitted because the pressure it exerts, for the time necessary, may provoke thrombosis where none was present. In many cases of vascular damage in which amputation is required, extensive thrombosis often is present, and the use of a tourniquet may exacerbate the condition. Through the direct medial approach the popliteal vessels can be secured easily without the use of a tourniquet. Both the artery and the vein are practically devoid of branches for a

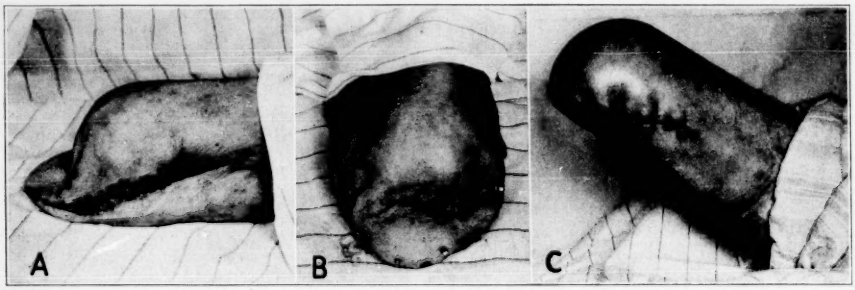

Fig. 7.—*A*, side view of the amputation flaps in place before suture. Notice the redundancy of both flaps toward the end of the operation. *B*, anterior view of the stump. The flaps are merely approximated, and the skin is sutured with widely spaced skin clips or sutures. *C*, the stump after one week. After all drainage has ceased, additional skin sutures are placed to obtain better skin coaptation.

fluid and allows all secretions to escape through the wide intervals between the clips or sutures. The major oozing usually stops in from one to three days but sometimes lasts many days. The cause of the excessive drainage sometimes encountered has not been determined. In some of our later cases, after almost all the drainage had ceased we applied skin clips over the intervals between the initially placed sutures. This procedure is warned against, however, as there is great danger that it will cause pocketing accumulation of serum. Serious infection has occurred in several cases, and three patients died. If additional skin sutures are placed late, one must be sure that absolutely all drainage from the interior of the stump has stopped (fig. 7 *C*).

As convalescence progresses, the posterior flap retracts gradually until the suture line, now posterior in position, is well proximal to the end of the bone, occasionally a distance of one or more inches. When it is recalled that the suture line at the end of the operation is an inch or more distal to the end of the bone, it becomes apparent how extensive is the power of the intact hamstring muscles to retract the posterior flap. In a short time the femur is lodged securely in the patellar fossa, thus assuring great stability to the considerable distance, and flexion of the knee allows the main trunks to be brought to the surface for easy ligation.

No explanation has been forthcoming as to why the profunda femoris artery and its terminals so rarely are involved by the pathologic processes which occlude the superficial femoral trunks and their terminals, the popliteal vessels. My co-workers and I have found that the profunda system not only nourishes the thigh but is able to vascularize amputation flaps which extend, as do the flaps in our amputation, well down into the superficial soft tissues of the leg. As evidence of this we often find free bleeding in the long flaps when both popliteal vessels are occluded. Even when little bleeding occurs, experience indicates that the blood supply is sufficient to ensure healing of the flaps.

Length of the Flaps.—Too little recognition has been given in the routine amputation at the lower third of the thigh of the extraordinary power of the hamstring muscles to retract and shorten the posterior flap. Practically all of these muscles arise in the pelvis and span a long, uninterrupted course to their insertion on the tibia, and severance of all of them allows retraction which, unless allowed for, will exert more tension than

the suture line will stand. These muscles are cut at their tibial tendon attachments in the operation involving a long posterior flap. Although contraction still takes place, the flaps are so long that firm healing is accomplished before any great tension is exerted on the line of approximation.

The quadriceps muscle components of the anterior flap arise from a considerable portion of the shaft of the femur. In consequence, there is little tendency for this flap to retract, whether the quadriceps tendon is cut in the suprapatellar area, as in the routine amputation, or in the infrapatellar portion, as in the endoplastic operation. Section of the iliotibial tract at its insertion on the tibia exerts little traction on the anterior flap because of the shortness of the span of the tensor fasciae latae muscle, which activates it. In one case the femur was cut so long and the posterior flap so short that the tension on the anterior flap was sufficient to force the femur to slough through the anterior flap, necessitating skin grafting for repair.

Too short a stump for adequate leverage on a prosthesis is a frequent fault of amputations at the lower third of the thigh. When for any reason a reamputation becomes necessary, the bone is short indeed. No fault is found with the length of the stump obtained by the Gritti-Stokes procedure, but there is difficulty in obtaining bony union between the patella and the femur. It seems probable that the osteoplastic type of amputation would be improved by adoption of the principle of a long posterior flap to eliminate tension at the suture line. Experience suggests that the broad flat surface of the femur at the beginning of the condylar flare is superior to the rounded anterior surface of the patella as a weight bearing surface.

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Pyogenic Infection of the Wound.—The routine amputation is subject to criticism because of the number of ways it may contribute to pyogenic infection. The short flaps necessitate that initially there be considerable tension on the suture line. This tension increases enormously as contraction of the hamstring muscles takes place postoperatively. This tension favors necrosis, especially in the all too many cases in which *en masse* ligatures approximate the anterior and posterior flaps. Dead spaces without drainage are created by this type of ligature, and débris collected therein becomes infected easily. Seepage from deliberate cross section of hamstring muscle bellies often distends the end of the stump and predisposes to infection. If one were to hold to the routine type of amputation, it would be well in all cases to institute drainage for forty-eight hours.

In the operation described, no other sutures than a few at the margins of the skin are used, allowing approximation of the flaps alone to heal the apposed structures. Between the widely spaced sutures any seepage which occurs can drain out readily. As gradual contraction of the posterior flap occurs, the dead spaces present at the end of the operation gradually disappear and drainage ceases. No tissues are under tension, and whatever blood supply is present in the flap is conserved to aid healing. By not severing any muscles in their fleshy bellies, paths for infection are not opened within their sheaths.

Gas Bacillus Infection.—Up to the time this tendoplastic amputation came into use in our hospital, gas bacillus infection had occurred after about 15 per cent of the amputations performed because of arteriosclerotic gangrene. Almost all of the patients died. About the same incidence of anaerobic infection was noted in patients requiring amputation because of diabetic gangrene, and half of these died. Gas bacillus infection occurred in the thigh stumps of one third of the patients having gas bacillus infection complicating compound fractures and lacerations below the knee. Two thirds of these patients died. When our tendoplastic amputation was used, gas bacillus infection occurred in the stump of only one of our patients requiring operation because of arteriosclerotic or diabetic gangrene and did not occur in the thigh stump of any patient requiring operation because of peripheral gas bacillus infection. The patient in whom infection occurred had his suture line opened and washed out with diluted solution of sodium hypochlorite. The wound is now ready for secondary closure. These improved results may be attributed to maintaining muscle bellies intact within their sheaths. Leaving the flaps open makes aerobic conditions for the field and prevents incubation of these dread invaders. In at least four cases of distal gas infection, the open type of operation apparently prevented infection in the amputation wound. When the wound is found not to be contaminated, the flaps are closed loosely before the posterior flap has retracted to such an extent that closure requires new section of the end of the bone.

Fig 8.—Healed stump. Notice the degree of retraction of the posterior flap. This retraction helps to lodge the end of the femur in the patellar recess.

Convalescent Period.—There is no indication for limiting the patient's activity during the early convalescent period. The routine of having the patient sitting up in bed on the day of the operation and in a wheel chair on the day after the operation reduces the postoperative complications. The short posterior splint used to close dead spaces does not interfere with activity and actually steadies the stump. Freedom from tension at the end of the stump allows free and comparatively painless movement.

MORTALITY

I have recorded eighty cases of amputation according to this method; thirty-two are my own and my associates', and the remainder were reported to us from about the country. By far the majority of the patients were over 65 years of age; eleven have died, a mortality of 13 + per cent.

450 Sutter Street.

ABSTRACT OF DISCUSSION

DR. JOSEPH S. MCGUINNESS, San Francisco: Dr. Callander should be congratulated on offering his amputation to supplant low thigh amputations where muscle splitting is necessary. We have had nine cases in the past two years at the University Hospital in San Francisco in which low thigh amputations were indicated. In these nine cases we have had one death, the patient dying in the postoperative period from pneumonia. All our patients have had complete occlusion of the artery, but healing occurred in all except the one who died. In the first

three cases we used general anesthesia, but since then we have used a local infiltration directly into the line of the suture, together with injection of 40 cc. of 1 per cent procaine hydrochloride into the knee joint. The only other place one need inject is in the periosteum before one divides the bone, and also in the sciatic nerve. This has given us our low mortality in these few cases, because most of the patients have been aged ones with severe vascular complications. We believe this amputation should be accepted instead of the commonly used low thigh amputation, because of its low mortality resulting from absence of shock and hemorrhage, and because of the fact that in those patients who were generally in good shape there is a good weight bearing end extremity to which an artificial leg can easily be applied.

HEPARIN AND THROMBOSIS

THE PRESENT SITUATION

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AND
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The anticoagulant heparin, discovered by Howell and Holt in 1916, has recently been shown to be effective in the prevention of thrombosis of veins produced by various means in experimental animals.[1] When the work on heparin in the University of Toronto was commenced in 1929, it appeared that two main problems had to be solved before the effect of this substance could be studied in human subjects in whom thrombosis was feared. The first was the elimination of toxic material associated with the active principle. The products which were available at that time were not sufficiently innocuous to permit of their injection in large amounts over long periods of time to human subjects. In fact, products much purer than those which were then available have since been shown to possess toxic properties. The problem of purifying the active substance was attacked by our colleagues Charles and Scott,[2] working in the Connaught Laboratories, and the various fractions that they prepared were administered to experimental animals and some of the purer ones to human subjects. These investigators have recently produced a very satisfactory material of high potency, and Schmitz and Fischer [3] in Germany have had similar success. The results of the use of this purified material in experimental animals and of the preliminary study of its administration to human patients have already been published (Murray, Jacques, Perrett and Best, 1937).[4] Jorpes,[5] who has recently made some interesting contributions to our knowledge of the chemistry of heparin, has prepared purified material by the method of Charles and Scott. This has been made available to a group of his clinical colleagues who are engaged in a study somewhat similar to that which is in progress in the University of Toronto.[6] The Swedish workers report that no toxic results are produced when heparin, made by the method elaborated in Toronto, is administered intravenously to human subjects.

The second problem had to do with the investigation of the effects of heparin on thrombosis produced experimentally. The results of the first study were referred to in the opening paragraph of this article. Quite recently Best, Cowan and MacLean [7] have shown that in certain species of laboratory animals the formation of white thrombi, which regularly takes place when blood is made to pass through glass loops outside the body, is in large part prevented if adequate amounts of heparin are administered. This result is readily demonstrable in dogs, cats and monkeys, and the effect may be shown also in the rabbit. It would therefore appear that a product which can safely be given to human subjects and which is capable of preventing thrombosis in experimental animals is available.

As a result of publication of the recent observations on experimental animals, a great many enquiries have been received from clinicians, and it is hoped that some of the questions raised can be answered here. It is obvious that, before any conclusions can be reached with regard to the application of the experimental results to the clinic, a very large number of cases must be studied. While there are a number of clinical conditions in which the effects of heparin might prove of interest, the attempt to influence the incidence of postoperative embolism seemed to us the most satisfactory method of approach to the general problem. Two hundred and twenty-two patients have now received heparin after operation in the department of surgery in this university, but it is obvious that many times this number must be studied before any conclusions as to its efficacy in preventing thrombosis can be reached.

It should be thoroughly appreciated that there is as yet no proof that heparin will prevent the formation of a thrombus in the human subject. We believe that the problem will be advanced most rapidly if the use of heparin is restricted at the present time to clinics where all facilities necessary for the study are available and where accurate records of the incidence of postoperative thrombosis, with a reasonably constant type of postoperative care, have been kept.

To facilitate the work of other students of this problem the following brief notes on our method of procedure may be given: The heparin solution is added to an intravenous saline drip. Usually 1,000 units [8] of heparin, i. e., 10 mg., is added to each hundred cubic centimeters of saline solution. The saline and heparin mixture is allowed to run into the vein at such a rate that the clotting time of the patient's blood is maintained at about fifteen minutes; i. e., two or three times the normal value. The results of the studies on dogs justify the assumption that this amount of heparin might exert a definite effect on thrombus formation. The rate of administration of saline solution may be 25 drops per minute, but this varies greatly from case to case. The injection of heparin is now being restricted to those cases in which very extensive surgical procedures have been carried out. The injection is continued for varying periods up to fourteen days after the operation. The level of the clotting time of the

From the Department of Surgery and the Department of Physiology, University of Toronto Faculty of Medicine.

1. Murray, D. W. G.; Jaques, L. B.; Perrett, T. S., and Best, C. H.: Heparin and Vascular Occlusion, Canad. M. A. J. **35**: 621-622 (Dec.) 1936.

2. Charles, A. F., and Scott, D. A.: Studies on Heparin: IV. Observations on the Chemistry of Heparin, Biochem. J. **30**: 1927-1933 (Oct.) 1936.

3. Schmitz, Adolf, and Fischer, Albert: Ueber die chemische Natur des Heparins: II. Die Reindarstellung des Heparins, Ztschr. f. physiol. Chem. **246**: 264-273 (May 3) 1933.

4. Murray, D. W. G.; Jaques, L. B.; Perrett, T. S., and Best, C. H.: Heparin and the Thrombosis of Veins Following Injury, Surgery **2**: 163-187 (Aug.) 1937.

5. Jorpes, Erik: The Chemistry of Heparin, Biochem. J. **29**: 1817-1830 (Aug.) 1935.

6. Hedenius, Per, and Wilander, Olof: The Influence of Intravenous Injections of Heparin in Man on the Time of Coagulation, Acta med. Scandinav. **88**: 443-449, 1936.

7. Best, C. H.; Cowan, Campbell and MacLean, D. L.: Heparin and the Formation of White Thrombi, Science **85**: 338-339 (April 2) 1937.

8. In consultation with Dr. A. F. Charles of the Connaught Laboratories it has been decided to change the size of the unit of heparin. The crystalline barium salt is apparently remarkably uniform in potency. Therefore this has been adopted as a standard and a certain amount of material set aside for this purpose. These crystals are now considered to contain 100 units of anticoagulant activity per milligram. This unit is five times as large as that referred to in our previous papers.

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patient's blood after the operation may, in the present state of our knowledge, be used as a guide in determining the initial rate of injection of heparin. The clotting time may be determined by one of the simple methods such as the breaking off of bits of a capillary tube which has been filled with blood.[9]

When this dosage of heparin is used and the injection is begun from one to three hours after the operation is completed, our experience indicates that there is little danger of bleeding from the cut surfaces if very thorough hemostasis is practiced. There is always the possibility, however, that this might happen in spite of the greatest care. The patient should obviously be most carefully watched with this point in mind. It should be emphasized that nothing but the purest heparin is to be used in the investigation of the effects on human subjects. All the heparin used in the clinic here has been prepared by Dr. Charles as a crystalline barium salt and the barium has subsequently been completely removed. When this material is administered, as outlined, no toxic effects are observed.

Through the generosity of a private citizen, the cooperation of the Connaught Laboratories and the continued aid of the Banting Research Foundation, arrangements have now been completed which will probably permit investigation of the effects of heparin for an extended period in the department of surgery. It is hoped that the results of this study, in conjunction with reports which may appear from other sources, will permit a conclusion to be reached regarding the therapeutic possibilities of heparin.

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Clinical Notes, Suggestions and New Instruments

EPIDURAL HEMANGIOMA WITH COMPRESSION OF SPINAL CORD

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My purpose in this paper is to present a case of epidural hemangioma with a fatal outcome from compression of the spinal cord. The presence of a hemangioma in the subcutaneous tissue of the same dermatome and a sudden onset of paralysis and sensory changes below this level should have suggested the correct diagnosis. There would have been an expectation of complete recovery if the epidural hemangioma had been removed soon after the onset of symptoms.

Cushing [1] in 1906 cited three cases of his own and three from the literature in which facial hemangiomas were associated with vascular tumors of the cerebral meninges. In this article Cushing suggested for the first time that organs other than the skin, but in the same segment of nerve distribution, could be similarly affected. Since the publication of his paper facial hemangiomas and associated intracranial vascular anomalies have been observed many times.

Cobb [2] in 1915 reported one case of his own in which cutaneous hemangioma was present and seven from the literature, in all of which there were intradural spinal hemangiomas. In his own case there was an associated hemangioma in the skin of the same dorsal segment in which the intradural hemangioma was found at operation. This cutaneous hemangioma together with symptoms and signs of cord compression at this level led to a correct preoperative diagnosis of intraspinal hemangioma. Cobb arrived at the following conclusions: "1. Skin naevi (hemangiomas) are at times of diagnostic value when segmental phenomena referable to the central nervous system are involved. 2. Congenital blood-vascular tumors apparently arise from a developmental fault of the central nervous system so that these lesions may occur in any of the organs innervated by filaments from that neuromere."

Although much can be found in the literature about skin hemangiomas of the face associated with intracranial vascular anomalies, very little can be found about skin hemangiomas of the trunk associated with intraspinal vascular anomalies. The association of skin and epidural hemangiomas of the same embryologic segment is a feature of interest in the case reported here.

In 1929 Globus and Doshay [3] reviewed the literature and were able to collect the following verified cases of intraspinal vascular anomalies with symptoms and signs of compression of the spinal cord:

1. Twenty-eight cases of dilatations of spinal veins (also called pial hemorrhoids and angioma venosum racemosum).

2. Six cases of arterial or arteriovenous aneurysms of the spinal vessels.

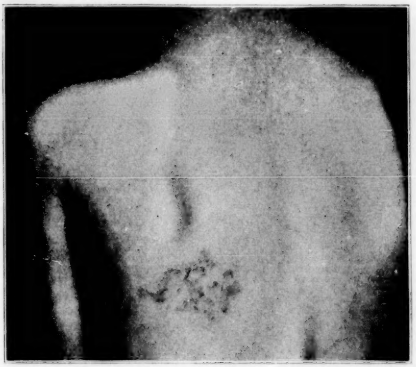

Fig. 1.—Back of patient showing hemangioma below left scapula at the level of the tenth rib.

3. Hemangiomas: (*a*) intramedullary hemangiomas, eight cases; (*b*) extramedullary pial hemangiomas, three cases; (*c*) epidural hemangiomas, ten cases; (*d*) vertebral hemangiomas, seven cases.

Since the publication of this report a review of the literature reveals only three additional cases of epidural hemangioma. These three cases,[4] together with the ten collected by Globus and Doshay, make thirteen. The following case report raises the total to fourteen cases. This type of vascular anomaly is particularly worthy of attention because of its extradural location and easy accessibility. In seven of the total of fourteen cases, laminectomy and removal of the tumor resulted in partial or complete recovery. In one case laminectomy resulted in death. In six cases laminectomy was not attempted. In none of the other thirteen cases was the onset so sudden and dramatic as the one described here.

REPORT OF CASE

History.—A boy, aged 5 years, while playing Feb. 16, 1931, complained of sudden abdominal pain. He continued to play for ten minutes and then came doubled over and screaming to

9. The clinical work in Professor Gallie's department has been conducted in collaboration with Dr. F. R. Wilkinson and Dr. Ross MacKenzie.

From the Department of Pathology, Vanderbilt University School of Medicine.

1. Cushing, Harvey: Cases of Spontaneous Intracranial Hemorrhage Associated with Trigeminal Nevi, J. A. M. A. **47**: 178 (July 21) 1906.

2. Cobb, Stanley: Hemangioma of the Spinal Cord, Ann. Surg. **62**: 641 (Dec.) 1915.

3. Globus, J. H., and Doshay, L. J.: Venous Dilatations and Other Intraspinal Vessel Alterations, Including True Angiomata, with Signs and Symptoms of Cord Compression, Surg., Gynec. & Obst. **48**: 345 (March) 1929.

4. Mixter, W. J., in Lewis, Dean: Practice of Surgery, Hagerstown, Md., W. F. Prior Company **12**: 54 (Chapt. 3) 1932. Connell, W. F., and Hay, W. D.: Cavernous Angioma of the Epidural Space with Compression of the Spinal Cord, Canad. M. A. J. **22**: 73 (Jan.) 1930.

his mother. She was unable to hold him and he fell after two or three steps. He complained that his legs were asleep and were without control. Paralysis remained complete. Two or three hours later he began shaking, and there were twitchings of the shoulders and arms. The neck became rigid and the head drew back, apparently in typical opisthotonos. This

Fig. 2.—Section through hemangioma in the skin of the back showing endothelial lined spaces filled with blood; × 75.

lasted for several minutes and he then relaxed, only to have a recurrence but with decreasing intensity. The legs were completely flaccid. The convulsions ceased and the child slept. Large doses of paregoric were given during the convulsions. He vomited once during the night. Since his legs were cold, a hot iron was placed at his feet. This burned the soles of his feet without causing pain.

February 17, twenty-six hours after onset, he was admitted to another hospital. The temperature was 102 F., the pulse 120. The abdomen was distended and slightly rigid, and there was a flaccid paralysis of the lower extremities. The neck was still rigid. Spinal puncture revealed a pressure of 170 mm. of water, a cell count of 80, all lymphocytes, no increase in the globulin and 30 mg. of sugar per hundred cubic centimeters.

Hemoglobin was 80 per cent, white blood cells numbered 12,800. Examination of the urine showed specific gravity of from 1.004 to 1.028 and no albumin or sugar. Sediment showed mucus with a few white blood cells.

No urine had been passed in the twenty-six hours previous to admission. He was catheterized repeatedly; there had been no improvement when he was discharged March 1. The hemangioma on the back was not mentioned. There was no record of a sensory examination. A diagnosis of poliomyelitis was made.

First Admission.—The child was cared for at home, being catheterized from one to three times a day. Although quite sick at times, he was not seen in a hospital again until Nov. 26, 1934, when he was admitted to the Vanderbilt Hospital for the first time at the age of 8 years. About sixty hours before admission he had chills and epigastric pain associated with vomiting. He did not appear very ill. The respirations were normal and the chest was clear. The abdomen was relaxed, and pressure on a small mass in the pelvis caused dribbling of urine. There was evidence of irritation about the penis, scrotum and perineum from constant dribbling. The rectal sphincter was relaxed. The testes were not felt in the scrotum or inguinal ring. There was atrophy of all muscle groups in the legs.

The cranial nerves were normal. Reflexes were hyperactive with abnormal toe signs and a marked mass reflex to painful stimuli which the patient did not feel. There was spastic paralysis of both lower limbs with anesthesia below the eighth and ninth dorsal vertebrae and questionable hyperesthesia at this level. Movement and sensation above this cord level were normal. There was prominence of the first lumbar spine. On the left side of the back there was a well circumscribed, raised, vascular mass measuring about 3 by 5 cm. There was no thrill or bruit. X-ray examination showed a little scoliosis in the lumbosacral region, but no pathologic change was noted in the bodies of the vertebrae or intervertebral disks.

Examination of the urine showed: albumin 2 plus, sugar negative, 25 white blood cells per high power field with some clumping, no red cells, and only an occasional granular cast (noncentrifugated).

Red blood cells numbered 3,880,000, with 11 Gm. of hemoglobin; white blood cells 32,200, with 75 per cent of polymorphonuclear leukocytes. The Wassermann and Kahn reactions were negative. Nonprotein nitrogen was 67, fasting blood sugar 56, carbon dioxide combining power 32.4 volumes per cent.

On lumbar puncture the initial pressure was 20 mm. of water, which rose to 250 mm. with compression of the jugulars and rapidly returned to 20 mm. when the pressure was released. The fluid was clear. There were 6 lymphocytes and 2 polymorphonuclears per cubic millimeter. Test with Pandy's reagent showed no globulin with two drops of fluid per cubic centimeter of Pandy's reagent.

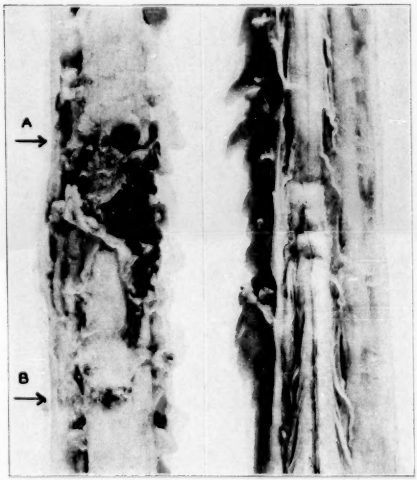

Fig. 3.—At left, posterior surface of dura showing the extradural hemangioma and fibrous tissue, which extended from *A* to *B* (eighth to twelfth dorsal segments). Note the normal dura above and below these levels. At right, anterior surface of cord with dura opened to show the localized area of atrophy (ninth to eleventh dorsal segments) opposite the extradural hemangioma.

In view of the results it was felt that the child had a transverse myelitis at about the level of the eighth to the twelfth dorsal cord segment with spastic paraplegia and that there was irreparable cord damage, and no exploration of the cord was done. He was discharged somewhat improved Jan. 1, 1935. The child had an infection of the urinary tract and

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some retention due to paralysis of the bladder. A suprapubic cystostomy was done and the nonprotein nitrogen fell slightly, but he continued to have a "picket fence" temperature with a summit of 103 F. He was followed in the outpatient department for the next thirteen months, during which the course was uneventful.

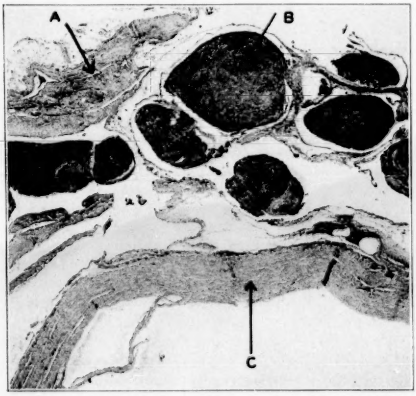

Fig. 4.—Section through extradural hemangioma showing old fibrosis (*A*), endothelial lined spaces filled with blood (*B*) and the dura (*C*); × 14.

Second Admission.—Four weeks before his second admission he contracted a severe cold and had a high fever, chills and a cough, which was productive of a moderate amount of purulent sputum without blood. One week before admission he complained of abdominal pain and became nauseated, vomiting everything he took, even water and most fruit juices. He passed very little urine, which was quite thick. He was drowsy the week before admission and was noted to have jerking movements of the legs but no headache or visual disturbances. For the second time he was admitted to the pediatric service of the Vanderbilt Hospital, Feb. 20, 1936.

The temperature was 99.8 F., pulse 140, respiratory rate 26. There was marked malnutrition, with atrophy and spasticity of the lower extremities. The cystostomy tube was draining thick yellowish-white urine. The patient was drowsy. The blood pressure was 136 systolic, 114 diastolic. The heart and lungs were normal.

Examination of the urine showed three plus albumin and innumerable white blood cells with marked clumping. There were also many red blood cells and a few granular casts. Nonprotein nitrogen was 124 on admission and 169 at death.

He was placed on a high caloric and high vitamin diet and fluids were forced. He was given dextrose intravenously and received one transfusion but continued to vomit, became more drowsy and died February 26, apparently of uremia.

AUTOPSY PROTOCOL

A complete gross and microscopic examination was done, but only the pertinent facts are included in the present report.

There was a hemangioma of the skin measuring 8 cm. in diameter, situated just below the left scapula over the tenth rib. Pyelonephritis was present.

On the posterior surface of the dura at the level of the eighth to the twelfth thoracic vertebrae there were fresh blood clots, and in this area was some tough grayish fibrous tissue. There were clots in dilated blood spaces. The leptomeninges were smooth, and there was no evidence of inflammation or hemorrhage within the dura. At the ninth to eleventh thoracic segments there was a distinct localized area of atrophy with grossly normal cord above and below this region. Directly behind this atrophic area was the extradural hemangioma and fibrosis, which undoubtedly caused compression of the cord.

At the level of the old atrophy of the spinal cord (tenth thoracic) there was almost complete demyelinization and disappearance of ganglion cells with increased irregular glial fibrosis. At this point the cord was greatly distorted and it was impossible to evaluate the tracts destroyed.

Briefly, the ascending tracts were involved above and the descending tracts below the lesion.

Sections through the dura at the tenth thoracic level showed extradural antemortem blood clots lying in dilated spaces lined with endothelium having the appearance of a true hemangioma. Some of these spaces had only an endothelial lining with a few supporting strands of fibrous tissue, while others had considerable fibrous tissue in the wall.

There was considerable extradural fibrosis as seen in the gross. This fibrous tissue was hyalinized and had a few phagocytic cells containing golden brown hemosiderin pigment.

COMMENT

The presence of a hemangioma in the dermatome below which there is sudden paralysis and sensory change should point to a diagnosis of intraspinal vascular anomaly, and such a diagnosis should have been made in the case reported here. Unfortunately this condition was not considered until three years later when the patient was seen for the first time in the Vanderbilt University Hospital. At this time there was an extensive cystitis and pyelonephritis with renal insufficiency resulting from repeated catheterization of the "cord bladder." A suprapubic cystostomy was done to allow free drainage of urine. The neurologists felt that the cord and kidney damage were irreparable and operation would only hasten the fatal outcome.

The sequence of events in this case can be explained readily by the pathologic changes. It seems likely that one of the thin-walled blood spaces of the epidural hemangioma of the tenth dorsal segment (fig. 3 left and fig. 4) ruptured, causing sudden compression of the cord. Sudden paralysis and sensory changes below this segment, epigastric pain and opisthotonos followed. Because the lesion was extradural, no red cells were

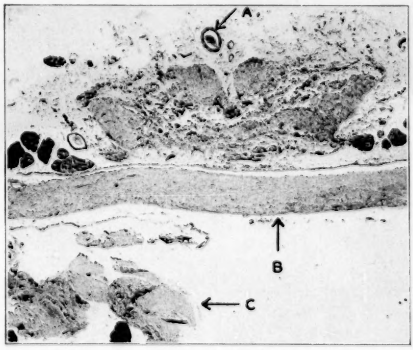

Fig. 5.—Section of cord and dura at tenth dorsal segment. Note the marked atrophy of the cord which lies between the ventral spinal artery (*A*) and dura (*B*). Some of the extradural fibrosis which was not peeled off remains at (*C*); × 14.

present in the spinal fluid. There was never any evidence that the compression of the cord was relieved, which would suggest an organization of the resulting extradural clot. The amount of extradural fibrosis is consistent with this hypothesis. The end stage of localized cord atrophy is best illustrated by photographs (figs. 3 right and fig. 5). Compression of the cord caused the so-called cord bladder. Repeated catheteri-

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zation led to cystitis and pyelonephritis. Renal insufficiency with uremia was the cause of death.

SUMMARY AND CONCLUSIONS

1. Globus and Doshay in 1929 collected from the literature ten reports of cases of verified epidural hemangiomas in which signs of cord compression were present. Four other cases, including the case reported here, make a total of fourteen such cases.

2. The case reported here is of particular interest because of the associated hemangioma in the same dermatome.

3. Cutaneous hemangiomas are of great diagnostic value when segmental phenomena referable to the central nervous system are involved.

Special Clinical Article

INJURIES OF THE KNEE JOINT

CLINICAL LECTURE AT ATLANTIC CITY SESSION

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KANSAS CITY, MO.

Derangements of the knee joint, the result of trauma, are comparatively common. This situation has been appreciated for a number of years in the British Isles but has not found wide recognition in this country; indeed, there is still a widespread lack of information here on such injuries. The almost universal indulgence through the British Empire in rugger football, which throws a heavy strain on the knee, with frequent injuries to this joint, is responsible for the development of the understanding which the members of the medical profession of Great Britain have of derangements of the knee. Today, with the opening up of the American game of football, the speeding up of baseball, automobile accidents and the great increase in industrial injuries, all leaving in their wake injuries to the knee joint, interest in the pathology of that joint is being quickened in this country.

Before the discussion of derangements of the knee joint is taken up, the anatomy of this important and complicated articulation might advantageously be reviewed. The knee joint consists essentially of the broadened ends of the tibia and the femur with a sesamoid bone, the patella, in the extensor apparatus; two fibrocartilages, interposed between the ends of the tibia and the femur; two cruciate ligaments, anterior and posterior, and two lateral ligaments, the internal and the external. In addition to these structures, comprising the knee proper, nature has provided it with strong muscles which play an important rôle in its control and protection. Such a complicated anatomic arrangement is necessary, for the knee must be strong, since it must sustain the body weight transmitted to it through long levers and at the same time must permit the wide range of movement necessary for locomotion and activity.

The great strength of the knee joint, however, is dependent on the integrity of the two cruciate and the two lateral ligaments and the muscles which surround it. So important are the ligments that a brief description of them is worth while (fig. 1).

The cruciate ligaments, anterior and posterior, help in preventing lateral movement of the knee, particularly when it is flexed. Their chief function, however, is to prevent the tibia from slipping backward and forward on the femur and to limit rotation of the tibia on the femur.

The internal lateral ligament, a long fan-shaped structure, is of great importance, since it sustains most of the burden of preventing lateral movement of the knee. It has further importance in that the internal semilunar cartilage is firmly attached to it, at least in its posterior part, so that stresses and strains to which it is subjected are transmitted to that cartilage.

The external lateral ligament is a long cordlike bundle, which, with the biceps tendon, strengthens the outer side of the joint. It is entirely separate from the capsule of the joint, and the external semilunar cartilage is not attached to it.

Any of the structures entering into the formation of the knee joint may, under proper condition of stress, be injured and the function of the joint interfered with. It is obviously impossible to attempt to discuss all the various injuries to the knee joint which may occur, and this paper will deal only with the three most common derangements which occur as the result of injury. They are (1) injury to the semilunar cartilages, (2) injury to the internal lateral ligaments and (3) injury to the cruciate ligaments.

INJURIES TO THE SEMILUNAR CARTILAGES

The internal and the external semilunar cartilage are crescentic fibrocartilages interposed between the tibia and the femur (fig. 2). They are thick at their outer border and thin at the inner margin. Each cartilage assists the opposite lateral ligament in resisting lateral movement of the knee, for it acts as a wedge between the tibia and the femur and helps to keep the cruciate ligaments tense. The outer thick margin of the internal semilunar cartilage is firmly attached to the capsule and to the internal lateral ligament. The inner margin is free. The anterior cornu of the internal cartilage is always attenuated, and its attachment to the tibia is never very strong. The external cartilage is less firmly attached to the capsule and has no attachment to the external lateral ligament. In addition, both cartilages are attached to the tibia by coronary ligaments (fig. 3), the fibers of which are weak and lax and permit some movement of the cartilages on the tibia. The fibers of the coronary ligament of the external semilunar cartilages are longer than those of the internal cartilage and permit wider range of motion between the external cartilage and the tibia than is possible with the internal. It is evident then that the external semilunar cartilage is much less firmly attached than the internal and has therefore a much wider range of movement. This fact has importance with reference to injuries of the cartilages, as will be seen later. Both cartilages move with the femur on the tibia in rotary or twisting movements of the knee.

Incidence.—In 214 of a series of 241 cases of derangement of the knee joint in the clinic with which I am associated, the diagnosis was injury to the semilunar cartilages. In 169 the injury involved the internal semilunar cartilage and in forty-five the external. Injuries to the internal semilunar cartilage then are three and seven-tenths times as frequent as those of the external cartilage. This ratio is lower than that reported by most observers, except Naughton Dunn[1] of Birmingham, England, who found that in 255 cases the ratio of injury to the internal semilunar

Read in the Surgical Division of the General Scientific Meetings at the Eighty-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 8, 1937.

1. Dunn, Naughton: Lancet 1:1267 (June 16) 1934.

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cartilage to that of the external cartilage was 2.6 to 1. The reason for the marked predominance of injuries of the internal semilunar cartilage over those of the external is anatomic. First, the greater mobility of the external cartilage allows it to move about and to avoid injury. Second, the range of inward rotation of the femur on the tibia, which is a direct strain on the internal semilunar cartilage, is greater than that of external rotation, which is a strain on the external semilunar cartilage.

Etiology.—While there are predisposing causes of derangements of the semilunar cartilages, such as joint disease, lax ligaments and static defects due to flatfoot and knock knee, the immediate etiologic factor is trauma. By far the greatest number of injuries to cartilage are due to indirect trauma, the most common type of which is inward twisting or wrenching of the knee when it is in a slightly flexed position and the foot is fixed (fig. 4) or outward rotation of the knee under the same conditions. With inward rotation of the knee, the internal lateral ligament is stretched and allows separation of the joint surfaces and slipping inward of the internal semilunar cartilage. As the separated bones snap back, the cartilage is nipped and damaged. If the rotating force continues, the cartilage moving with the femur on the tibia is torn loose or ground between the upper and the nether millstones and fractured.

It is commonly believed that the damage generally suffered is a tearing loose of the cartilage from its attachment to the capsule, with displacement. While this is true of injuries to the external semilunar cartilage, it has been the experience at our clinic, which coincides with that of Platt of Birmingham, England, and W. Rowley Bristow of London, England,[2] that so far as the internal cartilage is concerned a displacement is not frequent, but instead the cartilage, in the majority of instances, is fractured. Of sixty-eight internal semilunar cartilages operated on, fifty-four were fractured and only fourteen were hypermobile. The explanation of the difference in the type of injury suffered by the internal and the external cartilages probably lies in the manner of attachment of the cartilages. The external cartilage, being much more movable than the internal, can accommodate itself more readily to stress and strain and thus avoid serious injury. The fact that injuries to the internal cartilage are almost always fractures has a decided bearing on treatment.

Symptomatology.—In the case of an acute injury to the knee the history of a torsion or twisting strain on the knee joint is an important lead and should always suggest a careful investigation for injury to cartilage. The degree of trauma need not be severe; in fact, a comparatively slight twist under the proper conditions may result in damage. The knee immediately becomes distended with synovial fluid and some blood, is extremely painful on manipulation, particularly a twist, and cannot be completely extended; if complete extension is forced, extreme pain is complained of. There is usually tenderness on the inner side of the knee, just to the inner side of the patella over the attachment of the internal cartilage, or over the anterior attachment of the external cartilage to the outer side of the patella. Of these symptoms, failure of complete extension of the knee is most important in the opinion of my co-workers and me.

2. Bristow, W. Rowley: J. Bone & Joint Surg. **17**: 605 (July) 1935.

When a derangement of the knee is seen days or weeks after the injury, the picture may be quite different. There may be no effusion in the knee, and local tenderness over the cartilage attachment may be slight or absent. So long, however, as the cartilage or a fractured part of it is displaced, limitation of complete extension will persist. On examination it will be found that the knee both at rest and in weight bearing is held in from 10 to 15 degrees of flexion, and attempts to secure complete extension are resisted and cause pain over the cartilages, external or internal, and in the popliteal space. If the thigh is acutely flexed on the trunk, the knee is flexed to a right angle on the thigh and torsion movements of the knee are made, pain over the internal semilunar cartilage can be elicited with internal rotation if the internal cartilage is displaced or fractured and pain over the external

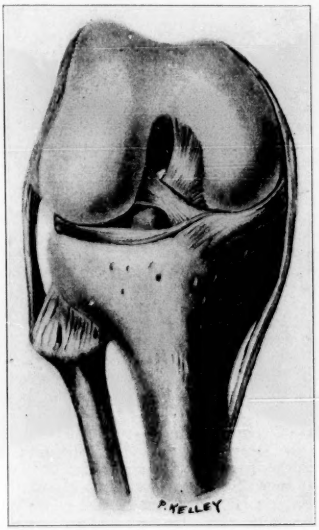

Fig. 1.—Anterior and posterior cruciate ligaments, internal lateral ligament attached to the internal semilunar cartilage and external lateral ligament.

semilunar cartilage on external rotation if that cartilage is involved. One sign of injury to cartilage which is frequently spoken of is "locking." By "locking" is meant a sudden fixing of the knee in a partly flexed position so that it cannot be extended until it is manipulated. "Locking" in this sense is, according to our experience, a comparatively rare occurrence. "Locking" in the sense that complete extension of the knee is impossible occurs in practically every case of injury to the internal cartilage but is somewhat less constant with injuries to the external cartilage. The condition, however, should be spoken of as "blocking" rather than "locking." In cases of subacute and chronic derangement, the patient, in addition to the objective symptoms, complains of pain in the knee on use, giving way and more or less insecurity—all due to the fact that the knee is being used in a more or less flexed

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position, with resulting strain, irritation and instability. The x-ray evidence of injury to cartilage will be negative.

Diagnosis.—In most cases the diagnosis of injury to cartilage is not difficult, though frequently it is impossible to make a definite statement as to the extent and location of the damage. The history of an injury with acute onset of symptoms, the characteristic point of tenderness, loss of complete extension, and pain and insecurity in the knee are the most reliable diagnostic

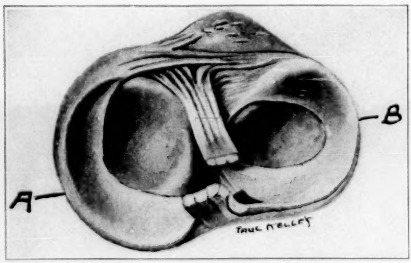

Fig. 2.—*A*, internal semilunar cartilage; *B*, external semilunar cartilage.

signs. The derangements of the knee which must be ruled out in diagnosing injuries to cartilage are the presence of loose bodies, tears of the cruciate ligaments and ruptures or strains of the internal lateral ligament. The presence of loose bodies may be eliminated by x-ray examination and the transitory character of the symptoms. Tears of the cruciate ligament are usually the result of severe injury and are accompanied by marked instability of the knee, particularly in the anterior posterior direction. Injuries to the internal lateral ligament give pain on the inner side of the knee, but there is no blocking of the extension, and the tenderness complained of is usually at the insertion of the ligament into the internal condyle of the femur and not over the cartilage.

Treatment.—Before I discuss the specific treatment of injuries to cartilage, I should make one statement as being applicable to all derangements of the knee joint. After any injury to the knee which produces effusion and definite symptoms of derangement, the knee should immediately be immobilized in extension by a plaster cast and should remain immobilized until the acute symptoms subside. Such a cast may be removed in a week or ten days, that is, when acute symptoms have disappeared, for more complete examination and the determination of the specific treatment indicated. With such a course, the knee joint is placed in the most favorable position for healing, whatever the form of injury may be, and the complete immobilization thus secured will insure the most rapid subsidence of acute symptoms and so enable an accurate estimate of the disturbance present to be made at the earliest possible moment.

The nature of the treatment of injuries to cartilage depends on whether the attack is the initial attack or a recurrence of a former one. Treatment should be conservative for an initial injury and in the acute stage of any attack and radical if disability persists after conservative treatment has been given a fair trial or if the patient has given a history of repeated derangements.

Conservative Treatment.—The keynote of conservative treatment of injuries to cartilage is reduction of the displacement of the cartilage or of the displaced fragment if the cartilage is fractured. To accomplish these measures when the internal semilunar cartilage is involved, the thigh should be flexed on the trunk acutely and the knee acutely on the thigh. The leg should then be abducted and rotated outward to increase the space between the internal condyle and the upper surface of the tibia. The leg should then be brought sharply into extension with as complete relaxation of the knee as can be obtained (fig. 5). At times an anesthetic may be used with advantage to secure the desired relaxation. Occasionally several attempts may be necessary to secure reduction, proof of which is that the knee may be completely extended without discomfort or pain. With injury to the external cartilage, the same maneuver with internal rotation instead of external rotation should be carried out.

After reduction has been secured a cast should be applied, extending from the upper part of the thigh to just above the ankle, and crutches should be used for locomotion. The cast should remain on a minimum of three weeks. At the end of this time it may be bivalved and massage and guarded exercise used to restore muscle tone and to build up muscle control of the joint. At the end of four weeks the knee may be used with a bandage support, which support should be worn for about another week. A fairly satisfactory number of displacements are completely cured with this form of treatment. Among seventy-three patients

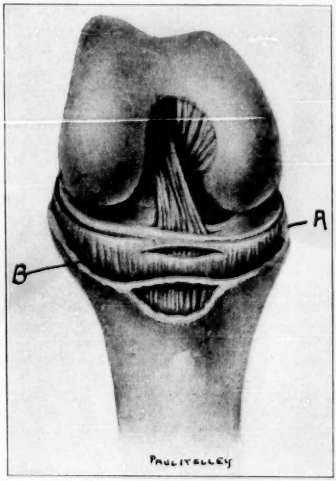

Fig. 3.—*A*, internal coronary ligament; *B*, external coronary ligament with its longer and more lax fibers.

treated conservatively for an injured cartilage, fifty-nine recovered, nine did not recover, and in five cases the outcome is unknown.

If, however, after well planned conservative measures have been carried out, complete extension of the knee cannot be secured and disability persists, operative

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treatment is indicated and is usually necessary for recovery. Also, if after recovery with conservative treatment other attacks occur, further attempts at conservative treatment will probably be unsuccessful and removal of the cartilage is indicated. With recurrent derangements the injury is almost certainly a fracture of the cartilage, and interference with the function of the knee joint cannot be overcome by any form of conservative management. Since experience has shown that most injuries to the internal semilunar cartilage are fractures, it follows that many will require removal.

Fig. 4.—Inward twisting of the knee in a flexed position; this is the form of trauma which is responsible for most of the injuries to the internal semilunar cartilage.

Operative Treatment.—The operation for removal of a semilunar cartilage must be carried out with rigid aseptic technic and with the use of a tourniquet. Various types of approach have been recommended, but our distinct preference is for that described by Sir Robert Jones [3] (fig. 6), which may be briefly described as follows: With the knee flexed to 90 degrees over the end of the table, an incision is made, starting at the lower internal angle of the patella, for the exposure of the internal semilunar cartilage, and extending downward and outward for about 3 inches. Care must be exercised so that the incision is not carried too far downward or outward, or the patellar branch of the internal saphenous nerve will be cut, and pain down the leg or a painful neuroma may result. This incision is deepened and the joint is entered. The cartilage is readily discernible and should be examined carefully for mobility and for fracture. As stated, hypermobility of the internal cartilage in patients who come to operation is not frequent, and the usual lesion is a fracture.

This fracture may involve the anterior half (30.8 per cent in our series) or the posterior portion (19.7 per cent in our series); it may be a longitudinal split (12.3 per cent in our series) or the so-called bucket handle type, in which the split-off section turns up and lies in the joint (16 per cent in our series). In 2.6 per cent the type of fracture was not recorded, and in 20 per cent the cartilage was hypermobile. It is our custom to remove the entire cartilage if possible, or at least all except the most posterior part. If complete removal is not carried out, fracture of the posterior part of the cartilage may be overlooked and symptoms reappear later. Naughton Dunn found in two large series of cases that from 49 to 50 per cent of the fractures occurred in the posterior part of the cartilage. It should be stated, however, that many competent operators feel that the removal of the detached portion of the cartilage is sufficient.

Removal of the cartilage should start at its anterior attachment, the operator first cutting the coronary ligaments, and the cartilage should be separated from before backward, while it is kept under considerable tension. One must exercise care not to injure the internal lateral ligament to which the cartilage is attached. After removal of the cartilage, the joint should again be carefully inspected and the external cartilage viewed as far as possible. A good view of the anterior part of the external cartilage can be obtained by careful retraction. The wound should be carefully sutured in layers when the closure is being made. No rigid fixation is used in our clinic after operation. A pressure bandage composed of voluminous cotton dressings, tightly compressed by a broad muslin bandage so applied that the cotton projects above and below the circular turns, is all that is used. This bandage controls hemorrhage and sufficiently immobilizes the knee. Mild movements are started in four or five days, and as soon as the stitches are removed on the tenth day active flexion and extension are encouraged and weight bearing permitted with the knee held in extension. Full use is permitted in three weeks, and normal activity may be resumed in four or five weeks.

The incision for removal of the external semilunar cartilage is exactly the same as that made for the removal of the internal cartilage except that it is placed on the outer side of the joint. At times both cartilages are involved, and both must be removed. This situation occurred in five of our cases. We prefer two separate incisions in such cases, as the cartilages can be removed with less trauma and more satisfactorily than with one large incision. The use of large incisions, such as the split patella and parapatellar approaches, is unnecessary and, in our opinion and in the opinion of many others, has distinct disadvantages in that more damage is done, the period of convalescence is prolonged and at times unnecessary residual disability results. If, on inspecting the cartilage in a knee which has been opened, one finds no fracture, but

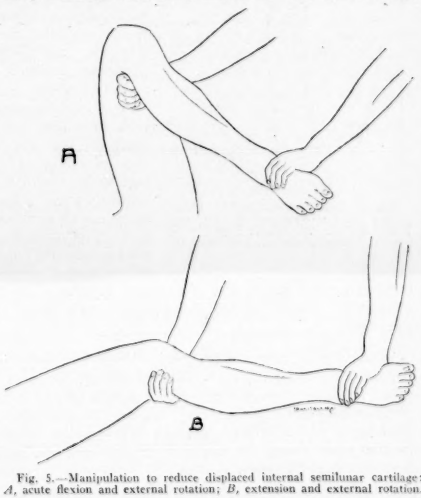


Fig. 5.—Manipulation to reduce displaced internal semilunar cartilage: *A*, acute flexion and external rotation; *B*, extension and external rotation.

3. Jones, Robert: Notes on Derangements of the Knee, Ann. Surg. **50**: 969-1001 (Dec.) 1909.

the cartilage is in any degree hypermobile, it should be removed, even if the degree of hypermobility does not seem sufficiently great to cause many symptoms, provided of course definite symptoms of derangement of the cartilage were present at examination before operation.

The results of removal of cartilage when properly carried out have been excellent according to our experience and that of a host of others. In seventy-six, or 86.3 per cent, of our series of eighty-eight cases in which one or both cartilages were removed, the results were good, in eleven, or 12.5 per cent, they might be termed incomplete and in one, or 1.2 per cent, they were unsatisfactory. By a good result is meant one which gives return of function in the knee and relief from disability, permits the resumption of the former occupation and allows the patient normal activity. By an incomplete result is meant one which relieves the symptoms but does not permit extensive activity to be entirely resumed. It should be remembered that when a displacement of cartilage has persisted over a period of months or years, secondary changes in the knee joint will occur, such as injury to the articular cartilages, arthritic changes, relaxation of the ligaments and loss of muscle control, and that even after the removal of the offending cartilage under such conditions, some interference with function and some disability may persist although the symptoms attributable to the derangement of cartilage may be entirely eliminated. Most of the incomplete results were of this class.

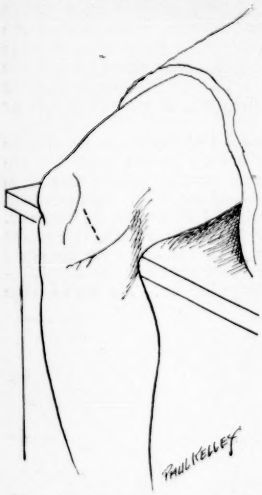


Fig. 6.—Jones's oblique incision with the knee flexed for removal of internal semilunar cartilage. The patellar branch of the internal saphenous nerve is seen below the incision.

INJURIES TO THE INTERNAL LATERAL LIGAMENT

Injuries to the internal lateral ligament are much more frequent than those to the external lateral ligament—about five to one. They are much less common than are injuries to cartilage. In 241 cases of injury to the knee joint, the internal lateral ligament was involved thirteen times.

Etiology.—As in the case of injuries to cartilage, there may be factors predisposing to lesions of the internal lateral ligament, such as faulty statics, due to flatfoot, knock knee and arthritis. However, acute strain of the internal lateral ligament is, as a rule, traumatic in origin, and the form of trauma responsible is usually indirect. The most common form of indirect trauma which causes injury to the internal lateral ligament is inward bending or inward rotation—the same type of injury which causes damage to the internal semilunar cartilage.

Symptoms.—At the time of the injury there are often a feeling as if something had torn loose on the inner side of the knee, acute pain referred to the inner side of the joint, often definite effusion into the knee and pain on attempts at complete extension, owing to the fact that in extension of the internal lateral ligament the ligament is made tense. "Blocking" of extension is not present. The flexed position which the knee assumes is due to the greater comfort it affords, and gentle forcing will bring the knee into full extension; this is impossible with "blocking" due to a displaced cartilage. The greatest point of tenderness is on the inner side of the knee, not over the attachment of the internal semilunar cartilage but farther back and usually higher up over the femoral attachment of the ligament. Less often, the point of tenderness may be over the attachment of the ligament into the tibia.

Treatment.—Treatment of tears of the internal lateral ligament in our clinic consists of complete immobilization of the joint in a cast, extending from the upper part of the thigh to just above the ankle, for four or five weeks. At the end of this time, massage and gradually increased active movements should be used to restore function. The joint should be protected between treatments for another week. At the end of five or six weeks protection should be discarded and resumption of normal activity should be encouraged, but strain on the ligament should be prevented by elevating the inner side of the shoe, heel and sole, three-sixteenths inch. The reason for rigid immobilization lies in the fact that after strain or tearing of the internal lateral ligament, traumatic exostosis or ossification of the ligament at the site of rupture or tear, usually at the femoral attachment, may occur, and we feel that complete immobilization until repair has taken place is the safest way to prevent or minimize such ossification.

Occasionally a rupture of the internal lateral ligament may result in so much laxity of the joint as to interfere with stability and cause definite disability. Under such conditions, operative procedures designed to reenforce the ligament by the use of fascial strips or to tighten the ligament by moving its attachment to the tibia downward, as described by Mauck,[4] are justified and give satisfactory results. Our own preference at the present time, however, is for reenforcement by fascial strips as being a less extensive procedure and satisfactory as a rule. At times painful ossification of the internal lateral ligament may require surgical intervention, but only if it continues to give painful symptoms. Ample time should be allowed for spontaneous recovery of the patient before one proceeds to operation.

RUPTURE OF CRUCIATE LIGAMENTS

Ruptures of the cruciate ligaments occur less frequently than injuries to the internal semilunar cartilages and about as frequently as injuries to the internal lateral ligament. In 241 cases of injury to the knee joint, rupture of the anterior cruciate ligament occurred twelve times and of both ligaments but once. The injury is frequently accompanied by evulsion of the tibial spine or its internal tubercle. This complication occurred with rupture of the anterior cruciate ligament four times in our series.

4. Mauck, H. P.: Virginia M. Monthly **47**: 18 (April) 1920.

Etiology.—The cause of rupture of the cruciate ligaments with or without fracture of the tibial spine is violence, and usually severe violence. To cause rupture of both cruciate ligaments, extreme violence is necessary—such violence as would produce complete dislocation of the knee. Tears or relaxation of the anterior cruciate ligament also occur with a certain percentage of injuries to cartilage. This fact should not be lost sight of, and when a knee is opened for removal of cartilage a careful inspection of the cruciate ligaments should always be made before it is closed. Failure to recognize a tear or relaxation of the anterior cruciate ligament is often responsible for an incomplete result following removal of cartilage.

Symptoms.—The history of a severe lateral bending or twisting of the knee is always suggestive, and if at the same time abnormal mobility is present, suspicion should be still further aroused. The anterior cruciate ligament is tense when the knee is fully extended and prevents the tibia from being displaced forward on the femur. It follows then that if in the extended position the tibia can be displaced forward on the femur there is a rupture or stretching of the anterior cruciate ligament. The posterior cruciate ligament is tense in complete flexion and prevents the tibia from being displaced backward on the femur. It follows then that if in complete flexion the tibia can be displaced backward on the femur there is rupture or stretching of the posterior cruciate ligament.

Our own preference, however, for determining relaxation or rupture of the cruciate ligaments is to have the patient sit on a table with the knee flexed to about a right angle and the heel lightly braced against the seat of the examiner's chair. If the leg is firmly grasped with one hand just below the bend of the knee and the lower end of the femur steadied with the other hand, abnormal forward or backward movement of the knee can be readily determined by firmly pushing and pulling the leg backward and forward. When the knee is in this position, which is midway between complete flexion and complete extension, both ligaments should be moderately tense and permit no backward or forward movement in the knee joint. If such movement is present, a rupture or relaxation of one or both ligaments is present. Further tests with the knee in the extended or flexed position will then make possible a differential diagnosis between involvement of the anterior and of the posterior ligament. If a definite diagnosis is impossible, the final diagnosis should be left for determination at operation.

The most constant sign of fracture of the spine of the tibia or its internal tubercle is obstruction to full extension. The "block" feels like a definite bony obstruction and is quite different from the rubbery "blocking" which occurs when a semilunar cartilage is injured. X-ray examination will demonstrate the fracture of the spine or its internal tubercle.

Treatment.—The management of a ruptured anterior cruciate ligament or evulsion of the tibial spine may be separated into that of the acute case and that of the chronic case with instability of the knee and persistent disability. The former should be conservative, the latter operative.

Conservative treatment consists of absolute immobilization of the knee in complete extension for two or three months. The repair of a ligament requires from five to seven weeks, and no strain should be placed on the knee during the period of repair. Plenty of extra time should be allowed for complete healing. Only temporary stiffness follows even prolonged immobilization, and such stiffness need not be feared. Excellent results are obtained by such conservative treatment adequately carried out.

Ruptured cruciate ligaments which have failed to heal with conservative measures and neglected conditions require operative intervention if stability is to be improved and disability eliminated or reduced. Sufficient of the original cruciate ligament may remain to permit of its being sutured at operation. When this situation is found, we prefer the use of fascia lata for the suturing material. With fascia lata a firm attachment can be made to the bone and a real repair of the ligament made. When, as often happens, there is but a trace of the ligament left, reconstruction of a new anterior cruciate ligament must be carried out. Hey-Groves of England was the modern pioneer in such work, and most of the operations now used are modifications of his method. In principle the method consists of boring a tunnel through the external condyle of the femur and another tunnel through the inner tuberosity of the tibia and of passing through these tunnels a strong piece of fascia lata or a piece of tendon and suturing it there in such a manner as to reproduce the original ligament.

The results of the various operations for the reconstruction of the anterior cruciate ligament are in the main satisfactory. Complete stability of the knee is not always secured, but, if the operation has been properly performed, satisfactory improvement will nearly always result, and complete relief of symptoms with a wide range of activity may be expected in a fair percentage of cases.

Rupture of the tibial spine or its internal tubercle will often become repaired with fixation of the knee in extension. If, however, healing does not take place, removal is indicated. The incision used is the parapatellar approach.

In conclusion I should like to emphasize the fact that internal derangements of the knee involving the semilunar cartilages or the lateral or the cruciate ligament constitute gravely disabling injuries. An accurate diagnosis made early will frequently make possible recovery by conservative measures, while, on the other hand, delay in instituting adequate treatment usually means a prolonged period of disability and frequently a permanent partial disability and makes necessary operative intervention. Finally, it should be generally recognized that, when conservative measures fail to give relief from an acute derangement of the knee or recurring derangements, operation is definitely indicated. If not too long delayed, operation offers a satisfactory outcome with practically no risk to joint or life, provided it is performed with a proper aseptic technic and by one familiar with the condition to be corrected.

1600 Professional Building.

Qualities Beyond Rating.—The qualities that really count in this world are quite beyond pigeonholing, quite beyond measurement by scales, tape or mental tests, quite beyond rating by any known system of examination, all of which fail in giving us an estimate of that most precious of all qualities, personality. The capacity of the man himself is only revealed when, under stress and responsibility, he breaks through his educational shell, and he may then be a splendid surprise to himself no less than to his teachers.—Cushing, Harvey: Consecratio Medici and Other Papers, Boston, Little, Brown & Co., 1928.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

ROSE CW-6 RADIATHERMY UNIT, ACCEPTABLE

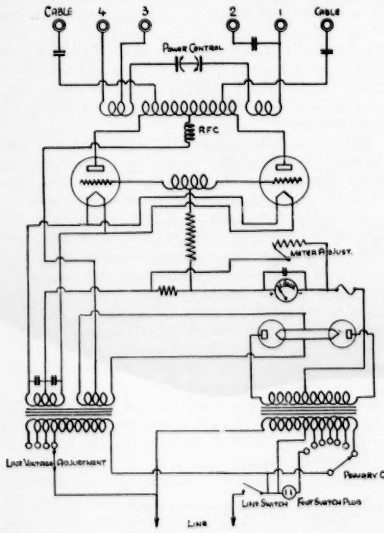
Manufacturer: The E. J. Rose Manufacturing Company, Los Angeles.

The Rose CW-6 Radiathermy Unit is intended for medical and surgical uses. Several terminal outlets are provided so that the inductance cable, the conventional condenser electrode or surgical electrodes for cutting and coagulating may be employed. The circuit comprises a tuned plate tuned grid push-pull oscillating system and is the only unit offered by the Rose Company with rectifier tubes. The patient circuit is inductively coupled to the oscillator, with a variable condenser incorporated in the circuit for tuning purposes. The wavelength for the unit is approximately 13 meters.

Rose CW-6 Radiathermy Unit.

The input power required to operate the unit at full load is about 700 watts. Since no reliable means has been devised for true measurement of radiathermic output wattage, no claims for such are made. However, a phantom load test by means of electric light bulbs connected through condenser pick-up plates and arranged to activate a photo-electric cell and calibrated meter approximates 350 watts.

The temperature rise of the transformer, after two hours' continuous operation at full load, was within the limits of safety prescribed by the Council. Burns may be produced but



Schematic Diagram of Circuit.

can be avoided by ordinary precautions. They are less likely to occur with this type of machine than with conventional diathermy.

As is customary, the E. J. Rose Manufacturing Company was asked to submit evidence to substantiate its claims as to the heating ability of the unit on the living human thigh. Eight observations were run with the inductance cable and eight with cuff electrodes. The subjects were eight healthy male medical students, four of whom were used for each method of application, two tests being made on each student for both methods. Temperature measurements were made with a thermocouple in the anterior portion of the thigh at depths of one-eighth inch, three fourths inch and 2 inches or on the bone. These depths were measured from the skin straight in; that is, normal to the skin surface. In applying the inductive cable,

Averages for Eight Observations, Coil Technic

Deep Muscle		Subcutaneous		Skin		Oral	
Initial	Final	Initial	Final	Initial	Final	Initial	Final
100.1	102.7	98.4	105.8	93.6	101.8	98.5	98.9

Averages for Eight Observations, Cuff Technic

Deep Muscle		Subcutaneous		Skin		Oral	
Initial	Final	Initial	Final	Initial	Final	Initial	Final
99.2	103.5	98.4	104.7	93.1	101.4	98.4	98.8

approximately one inch of bath toweling was wrapped round the thigh and it was held in place by approximately four wraps of the inductive cable. The averages for eight tests with first the inductance cable and next the cuff technic are given in the accompanying two tables.

The unit was investigated in a clinic acceptable to the Council and the report on its heating qualities was satisfactory. It was found to perform as successfully as other units of the same general type.

In view of the foregoing favorable report on the unit, the Council on Physical Therapy voted to include the Rose CW-6 machine in its list of accepted devices.

ALOE IMPROVED COLD RAY QUARTZ LAMPS ACCEPTABLE

Manufacturer: The A. S. Aloe Company, 1819 Olive Street, St. Louis.

The A. S. Aloe Company submitted five mercury glow ultraviolet lamps to the Council, namely:

1. Improved Aloe Cold Ray Quartz Lamp, Model CF-7890; standard portable combination lamp with approximately 80 inches of quartz tubing in the body grid.
2. Model CF-7894; identical to the former except that no provision is made in the transformer for an orificial burner.
3. Model 87; large portable general body lamp with provision for an orificial burner.
4. Aloe Standard Pedestal Cold Ray Quartz Lamp.
5. Aloe Standard Portable Cold Ray Quartz Lamp.

The mercury glow type of ultraviolet burner is essentially a low vapor pressure, low amperage (0.015 ampere), high potential (5,000 volts, open circuit), glow discharge similar to a Geissler tube. The burner is of transparent tubing, quartz, highly evacuated and containing rare gases and a few drops of mercury. The power consumed is small and there is no great rise in temperature with this type of burner.

Of the total radiation of all wavelengths less than and including the line at 3,130 angstroms, more than 95 per cent is contained in the resonance emission line of mercury vapor at 2,537 angstroms. The erythemogenic efficiency of this type of lamp is high, but that fact is not necessarily a criterion of its suitability for therapeutic purposes.

Therapeutically, the first three lamps mentioned generate sufficient intensity of ultraviolet radiation to produce a perceptible erythema on the average untanned skin in the following time-distance relationship:

Fifteen seconds at 12 inches from source to patient.
Forty seconds at 20 inches from source to patient.
Ninety seconds at 30 inches from source to patient.

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With the first two lamps, the orificial burner will produce an erythema on untanned skin as follows:

Five seconds with burner in contact with skin.
Fifteen seconds with burner 1 inch from skin.

The Aloe Standard Pedestal and Portable Models (Nos. 4 and 5 in this report) generate ultraviolet radiation of sufficient intensity to produce a perceptible erythema on the untanned skin in the following time-distance relationship:

0.5 minute at 12 inches from source to patient.
1.4 minutes at 20 inches from source to patient.
3.1 minutes at 30 inches from source to patient.

The orificial burner produces an erythema on untanned skin as follows:

Five seconds with burner in contact with the skin.
Fifteen seconds with burner at 1 inch from the skin.

Since these lamps meet the standards for ultraviolet radiation set by the Council, it voted to include in its list of accepted devices the Improved Aloe Cold Ray Quartz Lamp, Model CF-7890; Model CF-7894; Model 87; the Aloe Standard Pedestal and Portable Cold Ray Quartz Lamps for a period of one year.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

AMINOACETIC ACID (See New and Nonofficial Remedies, 1937, p. 48).

Aminoacetic Acid-Paul-Lewis.—A brand of aminoacetic acid-N. N. R.

Manufactured by Paul-Lewis Laboratories, Inc., Milwaukee, Wis. No U. S. patent or trademark.

AMINOPHYLLINE (See New and Nonofficial Remedies, 1937, p. 478).

Aminophyllin-Bischoff.—A brand of aminophylline-N. N. R.

Manufactured by the Ernst Bischoff Co., Inc., New York. No U. S. patent or trademark.

Tablets Aminophyllin-Bischoff, 0.1 Gm. (1½ grains).

Aminophyllin-Lederle.—A brand of aminophylline-N. N. R.

Manufactured by the Lederle Laboratories, Inc., Pearl River, N. Y. No U. S. patent or trademark.

Ampuls Solution Aminophyllin-Lederle, 0.24 Gm., 10cc.
Ampuls Solution Aminophyllin-Lederle, 0.48 Gm., 2 cc.
Tablets Aminophyllin-Lederle, 0.1 Gm. (1½ grains).

STAPHYLOCOCCUS TOXOID (See New and Nonofficial Remedies 1937, p. 405).

Mulford Biological Laboratories, Sharp & Dohme, Philadelphia and Baltimore.

Staphylococcus Toxoid-Mulford.—Prepared from staphylococcus toxin treated with formaldehyde and kept at 37 C. until the toxin is reduced in skin necrotizing doses from more than 10,000 to less than 10 per cubic centimeter with the minimal lethal dose on rabbits almost entirely lost and the hemolysin titer originally 0.003 cc. or less reduced so that 0.1 cc. injected intradermally into previously tested rabbits produces no evidence of necrosis. The product is processed in two strengths; dilution, containing in each cubic centimeter the toxoid obtained from 100 necrotizing doses of toxin, and dilution 2, containing in each cubic centimeter the toxoid obtained from 1,000 necrotizing doses of toxin. The requirements of toxigenicity and detoxification are: from 10,000 or more skin necrotizing doses per cubic centimeter to less than 10 skin necrotizing doses per cubic centimeter; from 300 to 1,000 or more minimum hemolytic doses per cubic centimeter to less than 10 per cubic centimeter; from 20 or more minimal lethal doses per cubic centimeter for mice to less than one minimal lethal dose in 0.5 cc.; from 10 minimal lethal doses per cubic centimeter per kilogram for rabbits to less than one minimal lethal dose in 3 cc. per kilogram. The skin necrotizing dose is that amount of toxin contained in 0.1 cc. volume of staphylococcus toxin diluted in physiologic solution of sodium chloride which, injected into the skin of rabbits, will at site of injection produce in forty-eight hours an area of necrosis 5 by 5 mm. in diameter.

Staphylococcus toxoid-Mulford is marketed in packages of one 5 cc. vial, each cubic centimeter containing the toxoid derived from 100 necrotizing doses of toxin, and in packages of one 5 cc. vial, each cubic centimeter containing the toxoid derived from 1,000 necrotizing doses of toxin.

SODIUM CACODYLATE (See New and Nonofficial Remedies, 1937, p. 94).

Ampoules Sodium Cacodylate-Abbott, 0.05 Gm. (¾ grain), 1 cc.
Prepared by the Abbott Laboratories, North Chicago, Ill.
Ampoules Sodium Cacodylate-Abbott, 0.097 Gm. (1½ grains), 1 cc.
Prepared by the Abbott Laboratories, North Chicago, Ill.
Ampoules Sodium Cacodylate-Abbott, 0.2 Gm. (3 grains), 1 cc.
Prepared by the Abbott Laboratories, North Chicago, Ill.
Ampoules Sodium Cacodylate-Abbott, 0.324 Gm. (5 grains), 1 cc.
Prepared by the Abbott Laboratories, North Chicago, Ill.
Ampoules Sodium Cacodylate-Abbott, 0.454 Gm. (7 grains), 1 cc.
Prepared by the Abbott Laboratories, North Chicago, Ill.
Ampoules Sodium Cacodylate-Abbott, 0.975 Gm. (15 grains), 2 cc.
Prepared by the Abbott Laboratories, North Chicago, Ill.

MERTHIOLATE (See New and Nonofficial Remedies, 1937, p. 293).

The following dosage form has been accepted:

Merthiolate Suppositories, 1:1,000: Each suppository weighs approximately 10 Gm. and contains merthiolate 1:1,000 in a glycerin and gelatin base consisting of 17.3 parts glycerin and 7.6 parts gelatin.

ANAEROBIC ANTITOXIN (See New and Nonofficial Remedies, 1937, p. 367).

Gilliland Laboratories, Inc., Marietta, Pa.

Gas Gangrene Antitoxin, Concentrated and Refined.—An antitoxic serum prepared by immunizing horses against the toxins of B. perfringens (Cl. welchii) and Vibrion septique (Cl. septique). After the desired potencies have been obtained the horses are bled and the plasma is separated from the cellular elements. The antitoxin is concentrated and refined by fractional precipitation of the plasma with salts by a method similar to that used for the concentration of diphtheria antitoxin. Potency is determined according to the methods described by the National Institute of Health. Marketed in packages of one syringe or one vial containing 10,000 units of B. perfringens antitoxin and 10,000 units of Vibrion septique antitoxin. Each package contains a 1 cc. vial of dilute (1:10) antitoxin for determination of sensitivity to horse protein.

Dosage.—From 20,000 to 40,000 units or more intravenously, supplemented with intramuscular administration. Dose may be repeated in from twelve to twenty-four hours, depending on the symptoms and response to initial dose.

Tetanus-Gas Gangrene Antitoxin, Concentrated and Refined.—An antitoxic serum prepared by immunizing horses against the toxins of B. tetani (Cl. tetani), B. perfringens (Cl. welchii), and Vibrion septique (Cl. oedematis-maligni). After the desired potencies have been obtained the horses are bled and the plasma is separated from the cellular elements. The antitoxin is concentrated and refined by fractional precipitation of the plasma with salts by a method similar to that used for the concentration of diphtheria antitoxin. Potency is determined according to the methods described by the National Institute of Health. Marketed in packages of one syringe or one vial containing 1,500 units of tetanus antitoxin, 2,000 units of perfringens antitoxin and 2,000 units of Vibrion septique antitoxin. Each package contains a 1 cc. vial of dilute (1:10) antitoxin for determination of sensitivity to horse protein.

Dosage.—For prophylaxis, the contents of one syringe or vial, intravenously or intramuscularly, depending on the incubation period. As indicated by severity of the wound this dose should be repeated two or even three times at intervals of several days. Local infiltration of the wound may be advisable.

METRAZOL (See New and Nonofficial Remedies, 1937, p. 301).

The following dosage form has been accepted:

Metrazol Ampules, 3 cc.: Each cubic centimeter contains 1½ grains of metrazol in aqueous solution with 0.1 per cent sodium phosphate.

EPHEDRINE (See New and Nonofficial Remedies, 1937, p. 215).

Ephedrine-Sharp & Dohme.—A brand of ephedrine-U. S. P.

Manufactured by Sharp & Dohme, Philadelphia and Baltimore. No U. S. patent or trademark.

EPHEDRINE HYDROCHLORIDE (See New and Nonofficial Remedies, 1937, p. 218).

Ephedrine Hydrochloride-Sharp & Dohme.—A brand of ephedrine hydrochloride-U. S. P.

Manufactured by Sharp & Dohme, Philadelphia and Baltimore. No U. S. patent or trademark.

Capsules Ephedrine Hydrochloride-Sharp & Dohme, ¾ grain.
Solution Ephedrine Hydrochloride-Sharp & Dohme, 3%: It is preserved with chlorbutanol 0.5%.

EPHEDRINE SULFATE (See New and Nonofficial Remedies, 1937, p. 220).

Ephedrine Sulfate-Sharp & Dohme.—A brand of ephedrine sulfate-U. S. P.

Manufactured by Sharp & Dohme, Philadelphia and Baltimore. No U. S. patent or trademark.

Ampoules Ephedrine Sulfate-Sharp & Dohme, 1 cc., ¾ grain.
Capsules Ephedrine Sulfate-Sharp & Dohme, ¾ grain.
Capsules Ephedrine Sulfate-Sharp & Dohme, ¾ grain.
Solution Ephedrine Sulfate-Sharp & Dohme, 3%: It is preserved with chlorbutanol 0.5%.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, JANUARY 8, 1938

MEDICINE AT THE NEW YORK AND SAN FRANCISCO EXPOSITIONS

Featured among the events of 1939 will be the two great expositions of the world's progress already scheduled for New York City and San Francisco. Plans have been fully completed; administration buildings have already been constructed. Sufficient progress has already been made to indicate the successful development of these great expositions according to the plans outlined.

By action of the Board of Trustees of the American Medical Association the physicians of this country will be represented in each of these great expositions by special exhibits. At the San Francisco exposition the American Medical Association will have the space fronting directly on the main entrance; there it will assemble a demonstration of the accomplishments of scientific medicine, particularly in the Pan-Pacific area. The progress made in overcoming and controlling plague, tularemia, leprosy and other disease menaces of the Far East should show to the public the reliance that may be placed on scientific medicine for its protection.

At the New York exposition the special committee in charge of the building to be devoted to medical science has evolved a new plan, idealistic in its conception and unique for such events. If it succeeds, it is likely to develop a new trend in such displays. Briefly, it is proposed that the progress of scientific medicine shall be revealed in demonstrations devoted to various diseases and special topics, each of the exhibits being in charge of a scientific committee chosen especially for that purpose and each of the exhibits being sponsored by a commercial sponsor who will be represented in the main exhibit only by a sign giving credit to him for his sponsorship. Such exploitation of commercial products as may occur will be wholly within a special section of the medical science building, planned as a professional club, to which section only physicians will be admitted.

The section of the exhibit in New York to be sponsored and developed by the American Medical Association will be devoted wholly to medical education, indicating how the Council on Medical Education and Hospitals and other activities of the American Medical Association have been vital since 1847 in raising the standard of medical education in the United States, improving the quality of medical service for the public and educating people as to what scientific medicine has done and can do for them. This work for the advancement of medical education is a demonstration of the manner in which a voluntary organization, working only by the forces of public education and publicity, is able to accomplish an important result for the public good. Thus the exhibit will give to the general public a double lesson much needed at this time. A feature of the medical building will be a mural decoration outlining the history of the advancement of medical science.

In its work of education of the people the American Medical Association is today availing itself of every possible modern means. Its contacts with the press, as revealed by the recently published report on the first press conference held in the headquarters office, its use of the radio both for national and for local broadcasts, its multiple appearances in great periodicals, and activities already in progress for greater utilization of the motion picture are an indication of the manner in which modern medicine may make itself apparent and audible to the vast majority of the intelligent public. It is significant that the British Medical Association has recently established a special bureau of public relations in an endeavor to achieve in Great Britain a service and a relationship similar to that developed by the American Medical Association in this country.

IRRADIATION OF CANCER OF THE BREAST

Fundamental in the surgical treatment of a malignant neoplasm is the widest possible removal of the primary growth together with its regional metastases. The standardized radical operation for cancer of the breast may be said to date from the publication in 1894 by William Stewart Halsted of his method. The operation included a careful clearance of the axillary contents, the removal of the supraclavicular lymph nodes, and the removal of the breast and of the pectoralis major muscle. In the later modification of the Halsted operation the dissection of the supraclavicular lymph nodes is omitted, but emphasis is placed on the removal of both pectoral muscles and the widest possible removal of the skin and fascia, frequently necessitating skin grafting to complete the healing of the denuded area. Obviously it would be impossible to go further in the direction of radical surgery.

While statistics accumulated in the course of the past quarter of a century show some improvement in the results, they are, on the whole, disappointing. According to Harrington,[1] 4,628 patients with cancer of the

1. Harrington, Stuart W.: Carcinoma of the Breast: Results of Surgical Treatment When the Carcinoma Occurred in the Course of Pregnancy or Lactation and When the Pregnancy Occurred Subsequent to Operation (1910-1933), Ann. Surg. **108**: 690 (Oct.) 1937.

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breast were operated on at the Mayo Clinic between 1910 and 1933. Of these, 63.8 per cent had axillary metastases and 36.2 per cent did not. The total three year survivals amounted to 56.4 per cent, while the total of five year survivals amounted to 43.6 per cent. Three year survivals of patients without axillary involvement reached 82.1 per cent, while those with axillary metastases had a survival rate of 41.9 per cent. The rate of five year survivals in the group free from axillary metastases was 72.1 per cent and of those with axillary involvement 28 per cent. Other large series present a somewhat lower survival rate, the average being somewhere between 43 and 56 per cent for the total three year period and from 30 to 43 per cent for the five year period.

Late diagnosis, incomplete operations, extension along lymphatic paths which are not accessible to the surgeon, and distant metastases were held responsible for the failure to accomplish better results. The discouraging aspect of the problem, well known to every surgeon, is the not too infrequent appearance of early metastases after the most radical removal for a small tumor and in the absence of axillary involvement.

Surgeons and radiologists, therefore, sought to improve their results by recourse to the new and powerful therapeutic agent irradiation. Various combinations have been utilized: (1) radical operation combined with postoperative irradiation, (2) radical operation combined with preoperative irradiation, (3) radical operation combined with both preoperative and postoperative irradiation, (4) incomplete surgical operation followed by irradiation, and (5) irradiation alone. Inoperable cases are of course a proper field for irradiation, since it accomplishes palliation of pain, retardation of the growth of the tumor and an occasional prolongation of life beyond anticipation. Postoperative irradiation has won considerable favor with American surgeons. According to Adair,[2] radical mastectomy followed by two high voltage roentgen cycles gave 72 per cent of five year cures when the disease was confined to the breast alone and 23 per cent in cases of axillary involvement, as compared with the earlier figures of 70 per cent and 20 per cent respectively. This improvement over radical surgery should be credited to the added irradiation. Grace and Moitrier[3] reported forty cases in which simple mastectomy was practiced. All the patients in this group received high voltage roentgen therapy during the entire period of postoperative life. They have obtained 52.9 per cent of three year cures and 44.1 per cent of survivals at the end of five years. These authors conclude that with adequate roentgen therapy and simple mastectomy it is possible to produce end results which are as satisfactory as those of any of the other procedures in practice at the present time.

The method of preoperative irradiation creates a problem of its own. If it is effective it is necessary, as Adair points out, to allow not less than two months after the completion of the treatment for radiation to become fully effective in producing the desired tissue changes. The question therefore arises whether the rate of tumor destruction exceeds the rate of tumor growth while the treatment is being carried out. It has been a common observation that the effect of irradiation on the axillary lymph nodes is much less than that on the breast. Adair found that in only three of the thirty-nine patients with involved lymph nodes treated by x-rays was there complete microscopic disappearance of cancer cells. Since almost half the patients are first seen with axillary involvement, the weak link in the chain is the inability of external irradiation to destroy cancerous invasion of the axilla. With the use of both external and interstitial irradiation as a complete therapy, according to Adair, 48 per cent of three year cures were obtained when the carcinoma was confined to the breast as contrasted with 72 per cent obtained by the radical operation and combined with postoperative irradiation. No five year cures were secured in cases of axillary involvement, whereas there were 23 per cent of cures in these cases treated by medical operation and postoperative irradiation. Preoperative irradiation either by x-rays or by the radium pack resulted in a definite reduction in the volume of the breast tumor and in a lesser extent of the axillary involvement. Adair's microscopic studies revealed no biologic difference in the two types of irradiation. Distressing skin ulcerations occurred after heavy doses of the radium pack.

In contradistinction to the disappointing results obtained by Adair from radiation alone are those of Geoffrey Keynes.[4] In his report on 250 cases treated by interstitial irradiation either alone or combined at most with the removal of a bulky tumor of the breast but never dissection of the axilla, he lists results which were somewhat better than those obtained by radical surgery in the same institution (the University College Hospital, London). Thus in the group of eighty-five patients in whom the breast alone was involved, the three year cures amounted to 83.5 per cent and the five year cures to 71.4 per cent. Keynes sees the following advantages in conservative treatment: (1) There is no operative mortality, (2) lymphatic edema of the arm is absent, (3) widespread local recurrences, such as are sometimes seen after a radical operation, are very uncommon, and (4) patients submit more readily to this treatment than to surgical operation because they are to be spared the mutilation entailed by the surgical procedure. Among the disadvantages, he mentioned the difficulty of inter-

2. Adair, Frank E.: The Effect of Preoperative Irradiation in Primary Operable Cancer of the Breast, Am. J. Roentgenol. **35**: 359 (March) 1936.

3. Grace, Edwin J., and Moitrier, William: Simple Mastectomy with X-Rays in Treatment of Cancer of the Breast, New York State J. Med. **36**: 701 (May 1) 1936.

4. Keynes, Geoffrey: The Place of Radium in the Treatment of Cancer of the Breast, Ann. Surg. **106**: 619 (Oct.) 1937.

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preting results. The radiation fibrosis frequently results in formation of fibrous lumps, particularly in the axilla, which are difficult to differentiate from recurrence. There is an increased liability to neuralgia or rheumatic pains in the treated area. On the other hand, McKittrick,[5] reporting ninety-six cases of treatment at the Palmer Memorial Hospital (Boston) by the interstitial irradiation technic of Keynes, concludes that "the finding of viable cancer cells in surgical and in autopsy specimens, the pain in and fixation of the pectoral region and the late deformity of the breast after radiation represents hazards which in our minds render this form of treatment less desirable than surgery in cases of primary operable cancer of the breast. It cannot be depended upon to protect the axilla against metastatic invasion."

The choice of treatment applicable to a given cancer, according to Coutard,[6] depends on the diagnosis of the degree of differentiation of the cancerous cells and the knowledge of the degree of fibrosclerotic transformation of the vasculoconnective tissue. The biologic effects of irradiation are those of the destruction of neoplastic cells and of the fibrosclerosing effect on the vasculoconnective tissue. Both effects are clearly appreciable within two weeks after the beginning of treatment. Coutard points out that cells of adenocarcinoma are able to remain for years enclosed within the fibrosclerotic tissue the result of irradiation from an external source. Thus Ewing reported the case of a woman irradiated for cancer of the breast and considered cured. Many years later she was killed in an accident, and necropsy of the previously treated breast revealed groups of neoplastic cells living enclosed within a fibrosclerotic capsule.

In addition to a technically operable cancer Coutard adds the concept of a biologically operable one; thus a tumor with slightly differentiated cells developing in a loose nonfibrous tissue is not suitable for surgery even though technically operable because of its tendency to rapid cellular multiplication and the immediate dissemination of the cells. Such tumors are most often accompanied by adenopathy. This is the radiosensitive type. Another type of tumor, from the therapeutic point of view, is that consisting of differentiated cells developing in fibrosclerotic connective tissues. They are more or less radio-insensitive. When technically operable they belong to the domain of surgery, because the cells multiply slowly, have only a slight tendency to dissemination and develop adenopathy rarely or late. Between these two sharply differentiated types are to be found intermediate cases difficult to differentiate. For these, a combination of surgery and irradiation is indicated.

Because of the frequent association of both young and undifferentiated cells with adult cells, Coutard considers it rational to irradiate first and operate later. Irradiation here destroys the cells most dangerous to the surgeon and leaves unmodified the cells of lesser activity. Coutard's method of preoperative irradiation consists in giving daily small fractional x-ray doses, from 300 to 400 roentgens, for from ten to twelve days. The surgical intervention must follow not later than the twentieth day before the possible appearance of new young cells. Coutard believes that in any combination of surgery and irradiation it is more efficacious to precede rather than to follow. He concludes that, since irradiation alone has not yet produced the cure of an appreciable number of inoperable adenocarcinomas over a period longer than five years, those tumors which are technically and biologically operable should by preference be operated on, as a rule, after a moderate external irradiation.

The weakness of radiation therapy in the final analysis is due to our inability to estimate the reactivity of connective tissue and to evaluate the presence of mitosis or of cicatrization.

5. McKittrick, Leland: Interstitial Radiation of Cancer of the Breast, Ann. Surg. **106**: 631 (Oct.) 1937.
6. Coutard, Henri: The Results and Methods of Treatment of Cancer by Radiation, Ann. Surg. **106**: 584 (Oct.) 1937.

Current Comment

DOES FEDERAL SUBSIDY MEAN FEDERAL CONTROL?

The assertion in THE JOURNAL that there is inherent danger in the acceptance of federal subsidies without absolute assurance of the avoidance of federal control has been met in many places by the assertion that such fears are unwarranted and by denial even of the possibility. Now there comes from the Grange trustee of Cornell University a charge of federal pressure in relationship to the conduct of agriculture research and education, which should prove to the doubters that the danger actually exists. According to the New York *Times*, H. E. Babcock of Ithaca on December 15 told the New York State Grange that the federal government was exerting constant pressure on Cornell University in seeking to have more and more to say about the conduct of agricultural research and education. The New York *Times* report continues:

"I do not need to point out to you that the federal government, mainly by the device of furnishing funds, has intruded its management into every sort of activity during the last few years," said Mr. Babcock, who is a Grange trustee for Cornell.

"It even influences you and me in the management of our farms by paying us to do this and that."

He expressed the fear that unless the "constant pressure" [on Cornell] was checked "it will lead us into complications and difficulties and I, therefore, have been very alert and shall continue to be alert to keep the management of the university within the state, even if necessary at the cost of revenue if it comes from federal sources."

He expressed the belief that research and teaching at Cornell had waned and attributed this to "ascendency in national agricultural affairs of a Secretary of Agriculture with a strictly Midwestern point of view, and with farm leadership having been more or less grabbed by a national farm organization under leaders who represent strictly Midwestern and Southern points of view."

VIOSTEROL AND PSORIASIS

The successful treatment of psoriasis is so difficult that the recent report of Ceder and Zon [1] in this connection is arresting. These investigators administered massive doses of viosterol without local treatment of the lesions, dietary adjustment or any other therapeutic measure. A series of fifteen patients from 30 to 50 years of age with chronic widespread psoriasis were given from 300,000 to 400,000 units of vitamin D as viosterol. Eleven of the fifteen subjects showed complete involution of the psoriasis within six to twelve weeks' time. Care was exercised to guard against possible hypervitaminosis, by weekly determinations of the concentration of calcium in the blood and urine. At the end of the period of treatment, three patients showed incipient symptoms of excessive vitamin D dosage. All the subjects exhibited an elevation in the level of blood calcium. After cessation of treatment there was a recurrence in some of the patients, though the degree of severity was much less than originally observed. Although there is a wide difference in toxicity of viosterol in the young and in the adult human subject and the proposed treatment would therefore appear to be safe, the authors suggest not only that there may be a smaller effective dose of viosterol but also that certain accompanying products of the irradiation of the ergosterol may be the potent factor. Obviously much more extended studies are necessary to permit positive conclusions.

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Association News

THE SAN FRANCISCO SESSION

Special Exhibit on Anesthesia in the Scientific Exhibit

A special exhibit on anesthesia will be shown in the Scientific Exhibit at the San Francisco session under the auspices of a committee composed of Dr. Ralph M. Waters, Madison, Wis., chairman; Dr. P. J. Hanzlik, San Francisco; Dr. Chauncey D. Leake, San Francisco, and Dr. Philip D. Woodbridge, Boston.

Application blanks for space in the Scientific Exhibit for other exhibits are now available and may be obtained from the Director, Scientific Exhibit, American Medical Association, 535 North Dearborn Street, Chicago.

RADIO BROADCASTS

The American Medical Association and the National Broadcasting Company present the fifth series of network health programs, beginning Oct. 13, 1937, and running weekly through June 15, 1938. The programs are presented over the Red network each Wednesday at 2 p. m. eastern standard time, 1 p. m. central standard time, 12 o'clock noon mountain standard time and 11 a. m. Pacific standard time.

The dates and topics of the broadcasts for the coming months are as follows:

Contagious Diseases

January 12—Scarlet Fever, Measles and Whooping Cough: modern attitudes toward these diseases; their prevention by community cooperation.

January 19—Smallpox and Diphtheria: unnecessary diseases; preventable by immunization of infants.

January 26—Poliomyelitis: information about the disease; cooperation with President's birthday ball.

Preventing Future Illness

February 2—Rheumatism and Arthritis: known factors in the causation of arthritis and its care.

The stations on the Red network are privileged to broadcast the program but, since it is a noncommercial program, they are not obliged to do so. Interest on the part of medical societies, woman's auxiliaries and others may have weight with program directors of local stations. A personal visit to the program director might be advisable if the program is not being taken by a local station. This is an opportunity for the appropriate committees of county medical societies to indicate their interest in having this program broadcast in their community and to enlist the interest of other groups.

1. Ceder, E. T., and Zon, Leo: Pub. Health Rep. **52**: 1580 (Nov. 5) 1937.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Society News.—Dr. William Nicholson Jones, Birmingham, addressed the Etowah County Medical Society in Gadsden November 16 on "Importance of Endometrial Studies in the Management of Functional Menorrhagias," and Dr. James O. Finney, Gadsden, "Modern Antisyphilitic Therapy."

Personal.—Dr. Julius E. Dunn, Fort Payne, for two years health officer of DeKalb County, has been appointed to a similar position in Lauderdale County, with headquarters at Florence.——Dr. Samuel D. Sturkie, formerly of Oneonta, has been appointed health officer of Chilton County, succeeding Dr. John M. Kimmey, Clanton, who resigned to accept a similar position in Calhoun County.

ARIZONA

Personal.—Dr. Orville H. Brown, Phoenix, Ariz., has resigned as editor of *Southwestern Medicine* and Dr. Maurice P. S. Spearman, El Paso, Texas, has been appointed to succeed him. Dr. Spearman is 34 years old and graduated from Baylor University College of Medicine, Dallas, Texas, in 1934.

CALIFORNIA

Gastro-Enteritis Outbreaks.—Three outbreaks of gastro-enteritis were reported to the state department of health recently, involving fifty cases, mostly in children, in Riverside County, twenty-five employees of an institution in Mendocino County, and forty-three children in a Colusa County school. An investigation did not reveal the sources of the outbreaks.

State Association News.—The county medical societies of Riverside, San Bernardino, Orange, Imperial and San Diego held "state association nights" January 4-10. Various officers of the state medical association, including Drs. William W. Roblee, Riverside, president-elect, Lowell S. Goin, Los Angeles, speaker of the house of delegates, Calvert L. Emmons, Ontario, and Chester O. Tanner, San Diego, councilors, and Frederick C. Warnshuis, secretary, were the speakers. The state association will sponsor a three weeks all expense Mexican tour leaving San Francisco by special train February 11. It is limited to physicians and dentists and their immediate families.

Human Death from Rabies.—A veterinarian living in Los Angeles County died from rabies October 18. While administering an antidote to a small dog for suspected arsenic poisoning, July 19, the veterinarian was bitten on both thumbs. The animal died the following day and the head taken to a laboratory was found positive for rabies. The Pasteur treatment was administered to the veterinarian within twenty-four hours. About October 12 or 13 the patient suffered from headache and from pain in his hand and arm and was unable to sleep. He became progressively worse and died October 18. The antirabies serum was manufactured by a reliable firm and had been kept under proper refrigeration. According to the state department of health, it would seem probable that the cauterization of the wound was late and did not destroy the virus under the thumbnail that had been pierced by the dog's teeth.

IDAHO

Changes in Health Officers.—Dr. Howard L. McMartin, recently appointed health officer of the Twin Falls district, has been made head of the division of maternal and child welfare in the state department of health. Dr. Robert B. Stump, formerly of Cleveland, will succeed Dr. McMartin at Twin Falls.

Society News.—Dr. Oza J. LaBarge, Salt Lake City, addressed the Pocatello Medical Society December 2; his subject was "Clinical Significance and Treatment of Auricular Fibrillation." Officers of the society elected at this meeting are Drs. Dan C. McDougall, president; George G. Fitz, Bancroft, vice president, and Ben C. Eisenberg, secretary-treasurer. ——Drs. Bernard P. Mullen and Ralph H. Loe, Seattle, addressed the North Idaho District Medical Society in Lewiston recently on "Management of Adhesions" and "The Value of Gastroscopy" respectively.——Dr. Francis A. Goeltz, Salt Lake City, addressed the South Side Medical Society in Burley recently on treatment of urinary infections.

IOWA

Physician Honored.—Dr. and Mrs. Samuel K. Davis, Libertyville, were entertained at a dinner recently by members of the Jefferson County Medical Society honoring Dr. Davis for nearly half a century of medical practice. A desk set was presented to Dr. Davis and a basket of flowers to his wife. Dr. James S. Gaumer, Fairfield, was toastmaster, and speakers included Dr. Harold A. Spilman, Ottumwa; Charles H. Carter, Ph.D., Fairfield; Dr. James Frederic Clarke, and Dr. Davis's son, Dr. Austin Clifford Davis, Rochester, Minn. Dr. Davis graduated at the Keokuk College of Physicians and Surgeons in 1888; he served as secretary of the Jefferson County Medical Society in 1915 and is now president of the local school board.

Society News.—Dr. Cecil C. Jones discussed "The Relationship between General Medicine and the Eye, Ear, Nose and Throat" before the Polk County Medical Society and the Des Moines Academy of Medicine in Des Moines, December 14, and Dr. Hiram B. Henry, "Psychiatry and Medicine." At a meeting, November 30, speakers were Drs. John Russell on "Collapse Therapy in Pulmonary Tuberculosis" and Arnold M. Gordon, "Lesions of the Esophagus."——Dr. Frederic J. Cotton, Boston, discussed "Fractures and the General Practitioner" before the Linn County Medical Society in Cedar Rapids December 9, and Dr. Edwin B. McConkie, Cedar Rapids, "Treatment of Essential Thrombocytopenia with a Report of a Case Treated by Splenectomy."——The Pottawattamie County Medical Society was addressed in Council Bluffs, December 6, by Drs. Frank R. Peterson, Iowa City, on "Hand Infections"; Michael J. Carey, Council Bluffs, "Spontaneous Pneumothorax," and Gorden N. Best, Council Bluffs, "Duodenal Obstruction." ——Dr. Clifford W. Losh, Des Moines, was elected president of the Iowa State Urological Society at its annual meeting in Des Moines December 4.

KANSAS

Personal.—Dr. Willis L. Jacobus Jr., Ottawa, has been appointed health commissioner of Franklin County to fill the unexpired term of his father, the late Dr. Willis L. Jacobus. ——Dr. Otto A. L. Hennerich, Hays, was guest of honor at a dinner recently given in recognition of his completion of twenty-five years' service on the staff of St. Anthony's Hospital.

LOUISIANA

Educational Symposiums.—A series of educational symposiums will mark the formal inauguration exercises of Rufus Carrollton Harris, LL.D., as the tenth president of Tulane University of Louisiana, New Orleans, January 16-18. The subjects will be education for women, legal education, the liberal arts college, graduate education and medical education. In the last named the speakers will be Dr. Waller Smith Leathers, dean, Vanderbilt University School of Medicine, Nashville, Tenn., and Alphonse M. Schwitalla, S.J., dean, St. Louis University School of Medicine. Dr. Charles C. Bass, dean of the medical school at Tulane, will preside.

MASSACHUSETTS

Grant to Continue Study of Alcoholism.—The Works Progress Administration has appropriated $27,121 to continue the study of alcoholism at the Boston City Hospital under the direction of Dr. Merrill Moore. Begun early in 1937 with an original allocation of about $44,000, the study seeks to determine the causes, costs and consequences of alcoholism.

Society News.—Dr. Merrill Moore discussed "The Study of Alcoholic Problems" before the Essex South District Medical Society in Danvers, January 5.——Dr. Benedict F. Boland, Boston, addressed the New England Society of Physical Medicine, December 15, on "Infections of the Uterine Cervix and Their Treatment by Electrosurgical Methods."——At a meeting of the New England Heart Association, December 13, in Boston, the speakers included Drs. George Kenneth Mallory, Brookline, and Chester S. Keefer, Boston, on "The Myocardium in Fatal Cases of Hemolytic Streptococcus Infections" and Eugene A. Stead Jr. and Paul Kunkel, "The Effect of Epinephrine and Pitressin in Circulatory Collapse."

Free Public Lectures.—The annual course of free public lectures at Harvard University Medical School will begin January 9 with a lecture by Dr. Harry R. DeSilva on "Men, Motor Cars and Alcohol." Other lecturers in the series are:

Dr. Shields Warren, January 16, Cancer.
Paul E. Boyle, D.M.D., January 23, Teeth: Deciduous, Permanent and Artificial.
Dr. Frederick F. Russell, January 30, Progress in Preventive Medicine.
Dr. Maxwell Finland, February 6, Colds, Influenza and Pneumonia.
Dr. John Rock, February 13, Menstrual Disorders and the Menopause (for women only).
Dr. Frank Dennette Adams, February 20, Overweight and Underweight.
Drs. Channing Frothingham and Richard H. Miller, February 27, Pain in the Abdomen.
Dr. Herrman L. Blumgart, March 6, Heart Disease.
Dr. Merrill Moore, March 13, Nervous Fatigue.
Dr. Reginald Fitz, March 20, The Family Medicine Cabinet: Home Remedies and When to Use Them.
Dr. Walter Bauer, March 27, Arthritis.

MICHIGAN

Personal.—Mr. Frank Bateman has been appointed business manager of the *Bulletin* of the Oakland County Medical Society.——Dr. Jerome F. Berry, Kalamazoo, has been appointed a member of the recently created Michigan State Hospital Commission, it is reported.——Dr. Louis J. Yglesias, assistant professor of surgery, University of Michigan Medical School, Ann Arbor, has resigned to enter private practice in Havana, Cuba. Dr. C. C. Chang has joined the department of surgery as assistant in the division of thoracic surgery, under the auspices of the Rockefeller Foundation, the University Hospital *Bulletin* reports.

Pediatric and Infectious Disease Society.—The sixteenth annual meeting of the University of Michigan Pediatric and Infectious Disease Society was held at the University Hospital, Ann Arbor, November 19-20. The speakers included:

Dr. Damon O. Walthall, Kansas City, Mo., Malignancy in Infancy.
Dr. Harry A. Towsley and John J. Engelfried, Ann Arbor, Observations on the Clinical Use of Sulfanilamide in Infections.
Dr. Louis Harley, Ann Arbor, The Use of Cevitamic Acid in the Treatment of Infantile Scurvy.

The program included a symposium on respiratory diseases with Dr. Roy M. Greenthal, Milwaukee; Dr. Carleton B. Peirce, Dr. Walter J. Nungester and Roy G. Klesper, and Dr. Franklin J. Mellencamp, Ann Arbor, as the speakers. Officers of the society are Drs. Moses Cooperstock, Marquette, president; William S. O'Donnell, Detroit, vice president, and David Murray Cowie, Ann Arbor, secretary.

New State Health Officer.—Dr. Don W. Gudakunst, deputy commissioner and director of school health service of the Detroit Department of Health, has been appointed state health officer, succeeding Dr. Clyde C. Slemons, effective February 1. A native of Paulding, Ohio, Dr. Gudakunst graduated at the University of Michigan Medical School, Ann Arbor, in 1919 and is now professor and chairman of the department of preventive medicine and public health on a part time basis at Wayne University School of Medicine, Detroit. Dr. Slemons has been health commissioner of Michigan since 1930. He was born in Cedar Springs in 1874 and graduated at the Detroit College of Medicine and Surgery in 1905. He was commissioner of schools in Wexford County from 1899 to 1903 and health officer of the city of Grand Rapids from 1909 until 1930.

MINNESOTA

Society News.—Dr. Sidney A. Slater, Worthington, was elected president of the Minnesota Public Health Association at the annual meeting in November.——Dr. Carl V. Weller, Ann Arbor, Mich., addressed the Hennepin County Medical Society, Minneapolis, December 6 on "Intrinsic Factors in the Causation of Cancer." Dr. Frederick J. Taussig, St. Louis, discussed "The Prevention of Abortion" before the society January 3.——At a meeting of the Minneapolis Surgical Society, January 6, the speakers were Drs. Stanley R. Maxeiner on "Autogenous Fascial Transplants"; Herman O. McPheeters, "Femoral Thrombophlebitis"; Arthur F. Bratrud, "Nerve Suture and Plastic Repair for Deformity of the Hand," and

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Owen H. Wangensteen, "Therapeutic Agents in the Management of Acute Infections of Extremities." All are of Minneapolis.——Dr. Ernst Gellhorn, Chicago, addressed the Minnesota Pathological Society in Minneapolis, December 21, on "The Pathologic Physiology of Anoxia of the Central Nervous System."——Dr. Byrl R. Kirklin addressed the Redwood-Brown County Medical Society in New Ulm December 8 on "Roentgenologic Diagnosis of Gastro-Intestinal Lesions."

NEW JERSEY

Clinical Pathologists Organize.—The New Jersey Society of Clinical Pathologists was recently formed with Dr. Asher Yaguda, Newark, as president. Dr. Robert A. Kilduffe, Atlantic City, is vice president and Dr. Arthur J. Casselman, Camden, secretary.

Society News.—A symposium on sulfanilamide was presented before the Hudson County Medical Society, Jersey City, January 4, by Drs. Perrin H. Long, Baltimore; Nicholas M. Alter, James F. Norton, Jersey City, and Traugott J. Schuck, Hoboken.——Dr. Arthur C. Morgan, Philadelphia, addressed the Gloucester County Medical Society, Woodbury, December 16, on "Acute Cardiac Tragedies."

NEW YORK

Graduate Course at Hudson.—The council committee on medical education of the Medical Society of the State of New York is sponsoring a course on "Treatment of Common Diseases" given by Buffalo physicians at the Hudson City Hospital. The lectures are as follows:

Dr. Abraham H. Aaron, December 20, Measures for the Relief of Distress Following Meals.
Dr. Nelson G. Russell, January 10, Treatment of Edema.
Dr. Clayton W. Greene, January 24, What Can We Do for Angina Pectoris and Coronary Occlusion?
Dr. Elmer H. Heath, February 7, Dyspnea and Its Treatment.
Dr. Francis D. Leopold, February 21, Modern Methods in the Treatment of Anemia.
Dr. Edward A. Sharp, March 7, Diagnosis and Treatment of Unconscious States.

Society News.—Dr. Daniel C. Patterson, Bridgeport, Conn., addressed the Dutchess County Medical Society, Poughkeepsie, December 8, on "Injection Treatment of Hernia."——Drs. Arthur H. Paine and Clarence H. Peachey, Rochester, addressed the Wayne County Medical Society, Lyons, December 7, on "Undiagnosed and Misdiagnosed Genito-Urinary Pathology" and "The Common Skin Diseases and Their Treatment," respectively.——Drs. Charles H. Goodrich, Brooklyn, president of the Medical Society of the State of New York, and Howard F. Root, Boston, addressed the Rensselaer County Medical Society, Troy, December 14, on "Preventive Medicine —An Evaluation of General Management" and "Recent Advances in Endocrinology with Special Reference to Diabetes" respectively.

New York City

Memorial to Dr. Warren.—The Brooklyn Home for Consumptives held a memorial service for Dr. Luther F. Warren, December 5, and dedicated a library on tuberculosis named in his honor. Dr. Warren was medical director of the home from 1932 until his death Jan. 18, 1937. He was professor of medicine at Long Island College of Medicine and physician in chief to the Long Island College Hospital.

Hospital News.—Dr. Irving S. Wright, chief of the vascular clinic, New York Post-Graduate Medical School and Hospital, delivered one of the Louis Adler Lectures in Cardiology at Manhattan General Hospital, November 29, on "Recent Advances in the Diagnosis and Treatment of Peripheral Vascular Diseases."——The Jewish Memorial Hospital has recently opened a new outpatient department of two floors with a fund of $100,000 given by the Martha M. Hall Foundation as a memorial to William Henry Hall.

Lectures on Diabetes.—The New York Diabetes Association has arranged a series of lectures for practicing physicians to be given on Thursday afternoons during January and February at the New York Academy of Medicine. They are as follows:

January 20, William H. Chambers, Ph.D., Physiology of Carbohydrate Metabolism.
January 27, Dr. Herman O. Mosenthal, Dietetic Management of Diabetes.
February 3, Dr. James Ralph Scott, Insulin and Protamine Insulin.
February 10, Dr. Dana W. Atchley, Treatment of Diabetic Ketosis.
February 17, Dr. Beverly Chew Smith, Gangrene, Infection and the Management of the Surgical Diabetic.
February 24, Dr. George Baehr, Cardiovascular Diseases and Diabetes.

Society News.—Drs. Harold Neuhof and Howard Lilienthal addressed the New York Surgical Society, December 8, on "Excision of the Axillary Vein in the Radical Operation for Carcinoma of the Breast" and "An Original Modification for the Incision in Lower Thoracoplasty" respectively.——The New York chapter of the International and Spanish-Speaking Association of Physicians and Dentists held its first meeting of the year November 26. A symposium on "special surgery" was presented by Dr. Max Thorek, Chicago; Malcolm W. Carr, D.D.S., and Dr. Howard Lilienthal, New York.——Dr. John Alexander, Ann Arbor, Mich., addressed the Brooklyn Thoracic Society, December 17, on "Indications for Surgical Treatment of Acute Pulmonary Suppuration."——At the monthly meeting of the Medical Society of the County of New York, December 20, the speakers were John Kirkland Clark, Esq., on "Expert Medical Testimony"; Elmer F. Andrews, state industrial commissioner, "Violations of the Workmen's Compensation Law"; Bernard Botein, assistant district attorney of New York County, "Fraudulent Accident Claims"; Dr. David J. Kaliski, "Right of Physicians Under the Workmen's Compensation Law," and Sol Ullman, assistant attorney general, "Medical Grievance Committee and Fraudulent Medical Practices."

NORTH CAROLINA

Society News.—Dr. Casper W. Jennings, Greensboro, was elected president of the North Carolina Eye, Ear, Nose and Throat Society at the recent annual meeting in Charlotte. Dr. Franklin C. Smith, Charlotte, is vice president and Dr. Milton R. Gibson, Raleigh, is secretary.

Personal.—Richard H. Shryock, Ph.D., professor of history, Duke University, Durham, received the Mayflower Cup awarded by the State Literary and Historical Association recently in Raleigh for his book "The Development of Modern Medicine," chosen as the "outstanding book by a resident of the state this year."

Gift for Medical Library.—The University of North Carolina School of Medicine, Chapel Hill, has received a gift of $1,000 from Mrs. Charles E. Kistler, Morganton, to be used toward the establishment of a Charles E. Kistler memorial library in the medical sciences, newspapers announced December 19. Mrs. Kistler made the gift in honor of the late Mr. Kistler, a graduate of the University who had a special interest in the medical school. She plans to make an annual gift of this amount, it was said.

OHIO

Dr. Todd's Twenty-fifth Anniversary.—Former students, present students, associates and friends of Dr. Wingate Todd, professor of anatomy, Western Reserve University School of Medicine, Cleveland, gave a surprise tea in his laboratory December 15 in honor of his twenty-fifth anniversary as a member of the faculty. About 500 guests greeted Dr. Todd, and on behalf of the staff of the anatomy department Dr. James E. C. Hallisy presented to Dr. Todd a number of books and etchings. Born in Sheffield, England, in 1885, Dr. Todd was educated at the University of Manchester and London Hospital and was lecturer in anatomy at his alma mater when he was appointed at Western Reserve in 1912. He is also director of the Hamann Museum of Comparative Anthropology and Anatomy.

OKLAHOMA

Personal.—Dr. Orval L. Parsons, Lawton, has been appointed health superintendent of Comanche County to succeed Dr. Lorin C. Knee, Lawton.——Dr. Giles E. Harris, Hugo, has been appointed health superintendent of Choctaw County to succeed Dr. Walter N. John, Hugo, and Dr. Forrest S. Etter, Bartlesville, has been appointed in Washington County.

TEXAS

Hospital News.—A new psychopathic ward constructed at a cost of $227,000 was opened at the Wichita Falls State Hospital in October, it is reported.——A twenty bed hospital for Hutchinson County was opened at Borger in October. The site was donated by John F. Weatherly, Panhandle, and the building cost $65,000. Many of the rooms were furnished by firms, individuals and clubs of Borger.

Society News.—Drs. John W. Torbett and Howard O. Smith, Marlin, addressed the Brown County Medical Society, Brownwood, November 8, on "Undulant Fever: Its Diagnosis and Treatment" and "Gastric Diseases Treated by Means of Surgery" respectively.——Drs. Margil C. Carlisle and R. Wilson Crosthwaite, Waco, addressed the McLennan County Medical Society in Waco, November 9, on "Brucellosis" and "The Cervical Rib" respectively.——Drs. Howard E. Lancaster and Ernest E. Miller, Beeville, addressed the Nueces County

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Medical Society, Corpus Christi, November 9, on "Gallbladder Disease" and "Conservative Treatment of Otitis Media" respectively.——Dr. Benjamin M. Primer, Amarillo, was elected president of the Texas Public Health Association at the annual meeting in Dallas in November.——Dr. Henry Grady Garrett, Dallas, among others, addressed the Dallas County Medical Society, January 13, on "The Therapy of Subacute and Chronic Gonococcal Infections by Means of Electropyrexia." At the meeting November 25 Dr. Matthew Hill Metz presented a paper on "Peptic Ulcer Treatment by Posterior Pituitary Extract" and Dr. Herbert F. Laramore, El Paso, spoke on "Toxemias of Pregnancy."

VIRGINIA

Medical College Centennial.—The Medical College of Virginia celebrated the one hundredth anniversary of its founding at the annual Founders' Day exercises December 7. Austin H. Clark, biologist of the staff of the Smithsonian Institution, Washington, D. C., gave the address at the ceremony on "Science in Colonial Virginia."

New Outpatient Clinic.—The hospital division of the Medical College of Virginia recently announced that its new outpatient clinic would be completed in December. This building was erected at a cost of about $550,000, of which $300,000 was the gift of an anonymous donor and $239,850 a grant from the Public Works Administration. The new clinic is eight stories high. The first floor will be used largely for administration, the second is for the medical department and the third is for the surgical department. The fourth floor will be devoted to biochemistry, the fifth to pathology and the sixth to bacteriology. For the present the seventh will be used for physical therapy and the eighth for office purposes.

WASHINGTON

Personal.—Dr. Norman E. Magnussen, formerly with the health department of Seattle, has been appointed health officer of Pierce County.——Mrs. James Tate Mason, Seattle, widow of the President of the American Medical Association at the time of his death, June 20, 1936, died suddenly in Portland, Ore., November 2, according to *Northwest Medicine*.——Dr. Arthur L. Ringle, Fresno, Calif., has been appointed health officer of Cowlitz County with headquarters in Kelso.

Society News.—A symposium on urologic subjects was presented before the Pierce County Medical Society, Tacoma, recently by Drs. Hiram S. Argue, Charles S. Pascoe, Charles F. Engels, Clyde Magill and George A. Moosey, all of Tacoma.——Dr. Frederick Lemere, Seattle, addressed the Thurston-Mason Counties Medical Society, Olympia, recently on insulin shock treatment of schizophrenia.——Drs. Harry L. Leavitt and Ralph H. Highmiller, of the state department of labor and industries, Seattle, recently addressed the Cowlitz County Medical Society in Longview and the Snohomish County Medical Society in Everett on relations of physicians to the department.

GENERAL

New Editor of Heart Journal.—Dr. Lewis A. Conner, professor of clinical medicine, Cornell University Medical College, New York, has retired as editor of the *American Heart Journal* after having served in that capacity since the establishment of the journal in 1925. Dr. Fred M. Smith, professor of the theory and practice of medicine, State University of Iowa College of Medicine, Iowa City, will be the new editor with the following associate editors: Drs. Horace M. Korns, Iowa City; Hugh McCulloch, St. Louis, and Irving S. Wright, New York.

Fraudulent Instrument Repair Man.—Physicians in Virginia and North Carolina have recently reported being swindled by an instrument repair man. In Virginia he claimed to represent a firm called Rawlings and Company, Baltimore, and in North Carolina used the name Runyon and Company, Atlanta. His victims gave him instruments to be repaired and paid for the work in advance. After a reasonable length of time they wrote to the addresses given and received reports that there were no such concerns. He is reported as being small of stature, with blue or gray eyes, slightly gray hair and wearing glasses. He claims to know many prominent surgeons.

Society News.—The American Congress of Physical Therapy will hold its next annual session in the Palmer House, Chicago, September 12-15.——The second annual Clinical Conference of Midwestern Radiologists will be held in the Muehlebach Hotel, Kansas City, Mo., February 11-12. The first conference was held in Rochester, Minn., in February 1937.——The fifteenth annual meeting of the American Orthopsychiatric Association will be held at the Stevens Hotel, Chicago, February 24-26.——Dr. Foster Kennedy, New York, was elected president of the Association for Research in Nervous and Mental Disease at its annual meeting in New York, December 28. Drs. Karl M. Bowman, New York, and Tracy J. Putnam, Boston, were elected vice presidents.

Grants for Research.—The American Academy of Arts and Sciences recently included in grants from its permanent science fund the following of medical interest:

Clarence C. Little, Sc.D., director, Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me., $1,000 to study the incidence of tumors and other growth abnormalities in a species cross in mice.

Karl E. Mason, Ph.D., associate professor of anatomy, Vanderbilt University School of Medicine, Nashville, Tenn., $500 for technical assistance in the development and standardization of reliable methods for the routine assay of food substances for their vitamin E content.

William F. Windle, Ph.D., professor of microscopic anatomy, Northwestern University Medical School, Chicago, for a trained assistant in a study of neurologic factors in the development of fetal respiration and other fetal behavior.

National Medical Art Association Plans Exhibit.—The American Physicians' Art Association, which was recently organized and now has about 400 members, plans to present the first national exhibit during the month of June at the San Francisco Museum of Art at the Veterans Auditorium. The association proposes to correlate the work of local art societies and to stimulate an interest in art among physicians throughout the country. All members of the American Medical Association who do any kind of art work (including photographic art) are invited to join the new art group and to submit work for the exhibit, which will be on view during the annual session of the Association, June 13-17. There are no dues. Any one interested is asked to communicate with Dr. Francis H. Redewill, secretary of the art association, Suite 521-536 Flood Building, San Francisco.

Fellowship for Study at Geneva.—The Institute of International Education announces that a fellowship is available for postgraduate medical study at the University of Geneva, Switzerland, through the Swiss American Student Exchange, for the academic year 1938-1939. The stipend is 3,000 Swiss francs, which is considered sufficient to pay living expenses on a moderate scale. It does not cover steamship passage and incidental expenses and the appointee must pay the matriculation and semester fees at the university, amounting to about 60 Swiss francs, and any laboratory fees that may be required. Opportunity is offered for study in general medicine, ophthalmology, pathology and child psychology. To be eligible a candidate must be an American citizen with a degree from an approved medical school and an adequate command of the French language, written and spoken. Men or women may apply; preference will be given to unmarried candidates under 35 years of age. Applications with credentials must be filed by March 1 with the Institute of International Education, 2 West Forty-Fifth Street, New York.

International Congress in New York, 1939.—The third International Congress for Microbiology will be held in New York, Sept. 2-9, 1939, at the Waldorf-Astoria, with Dr. Thomas M. Rivers, New York, as president. The congress will meet in the following sections: general biology, variation and taxonomy; general biology, microbiological chemistry and physiology; viruses and viral diseases; Rickettsiae and rickettsial diseases; protozoology and parasitology; fungi and fungous diseases; medical and veterinary bacteriology; agricultural and industrial microbiology, and immunology. There will be a registration fee of $5, which will not include the cost of a banquet ticket or a copy of the proceedings of the congress. The committee in charge urges that plans for attending should be made promptly in view of the world's fair in New York during the summer of 1939. The secretary of the congress is Dr. Martin H. Dawson, 620 West One Hundred and Sixty-Eighth Street, New York, and the treasurer is Kenneth Goodner, Ph.D., Rockefeller Institute for Medical Research, York Avenue and Sixty-Sixth Street, New York.

Proposed Qualifications of Health Officers.—The United States Conference of Mayors recently made public the report of a special board created early in 1937 to draw up qualifications that health commissioners in the larger cities should have. Appointment of the board was the first step in a program adopted by the mayors' conference to improve professional qualifications of municipal officers. Minimum requirements were outlined for three groups of cities. For a city of more than 500,000 the health officer should have graduated from a class A medical school and should have had not less than six years' full time experience in public health work, of which three

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should have been in an administrative position; a course of one year in a recognized school of public health may be substituted for two of the three years of general experience. For a city with a population between 100,000 and 500,000, the health officer should have in addition to a medical degree four years' experience, one of which must be in administrative work; one year's course in public health may be substituted for two of the three years of general experience. For cities under 100,000 the board recommended that in addition to a medical degree the health officer should have not less than two years of experience in public health work or one year of experience and one year's course in public health at a recognized school. The board will act at the request of any city to determine whether a candidate meets these requirements. Members of the National Health Officers Qualifying Board are as follows: Drs. Joseph W. Mountin, U. S. Public Health Service, chairman; Allen W. Freeman, professor of public health administration, Johns Hopkins University School of Hygiene and Public Health, Baltimore; John L. Rice, health commissioner of New York City; Wilson G. Smillie, professor of public health and preventive medicine, Cornell University Medical School, New York; Huntington Williams, health commissioner of Baltimore; Carl V. Reynolds, state health officer of North Carolina, Raleigh, and Edward S. Godfrey, health commissioner of New York state, Albany.

CANADA

New Officer of Grenfell Association.—Dr. Charles S. Curtis, medical superintendent of St. Anthony Hospital, sponsored by the International Grenfell Association at St. Anthony, Newfoundland, has been appointed medical superintendent and executive officer for the association on the coasts of Labrador and North Newfoundland, with jurisdiction over all the medical work of the organization. Sir Wilfred Grenfell, now 72 years old, remains as active superintendent but for reasons of health must now spend less time in the north. Dr. Curtis is a native of Spencer, Mass., and graduated from Harvard University Medical School in 1913. He has been in charge of the hospital since 1917.

FOREIGN

The Croydon Typhoid Epidemic.—The *Lancet* reported December 11 that the number of known or suspected cases of typhoid in an outbreak at Croydon first reported in November had reached 269. There had been seventeen deaths up to that time.

Wagner-Jauregg Honored by American Committee.—An award of $1,000 and a medal were presented to Prof. Julius Wagner-Jauregg, Vienna, by the Committee on Research in Syphilis through the Austrian consul general at a special meeting in New York November 24. The committee had voted to make the presentation several months hence, according to the New York *Times*, but arranged the ceremony in November hurriedly after it was learned that Professor Wagner-Jauregg, now 80 years old, was critically ill at his home in Vienna. The Austrian scientist was honored for his development of the malaria treatment of syphilis, for which he received the Nobel Prize in 1927. Among those present at the ceremony were Drs. William J. M. A. Maloney, chairman of the committee; William F. Snow, director general of the American Social Hygiene Association; Hubert S. Howe and Leopold Lichtwitz and Frau Sonia Weber, a niece of Dr. Wagner-Jauregg. The Committee on Research in Syphilis was organized in 1928 by a group of laymen, acting in cooperation with the American Social Hygiene Association, to subsidize and develop clinical and laboratory research.

Epidemic Commission to Aid China.—The League of Nations has appointed three groups of experts to give aid to Chinese authorities in organizing a campaign against epidemics in the war areas of China. The groups will not form a distinct international body operating in China but will be placed at the disposal of the government under the same conditions as advisers which the league has sent on former occasions. In their field work the groups will be mobile and will be provided with necessary equipment and emergency supplies, which will become the property of the Chinese government on the termination of the work. The French-speaking and German-speaking groups have been appointed and were to sail from Marseilles December 10. Dr. A. Lasnet, member of the Health Committee of the league and director general of public health in Algeria, heads the French-speaking group, which also includes Dr. Laigret, Dr. Dorolle, director of the municipal health service, Hanoi, and Dr. le Van Chinh, Hanoi. In the German-speaking group are Drs. Hermann Mooser, professor of bacteriology, University of Zurich, Switzerland; H. M. Jettmar, assistant professor of pathology, University of Vienna; Hans Winteler, formerly of Zurich and medical officer to a Himalayan expedition, and Mr. E. Etter, sanitary engineer, formerly of Zurich and recently on a mission to Persia. Dr. Robert Cecil Robertson, head of the division of pathologic sciences at the Henry Lester Institute of Medical Research, Shanghai, will be in charge of the English-speaking group, other members of which will be made known later, according to the announcement from the league.

Deaths in Other Countries

Dr. Erich Lexer, professor of surgery at the University of Munich, died December 5 in Munich, aged 70.

CORRECTIONS

Figures from Woman's Hospital.—The following figures are submitted from Woman's Hospital, New York City, as corrections and additions to data regarding residencies published in the Educational Number of THE JOURNAL, Aug. 28, 1937, page 699:

Obstetric and gynecologic inpatients treated	3,406
Gynecologic deaths	26
Obstetric deaths	8
Stillborn viable babies	28
Neonatal deaths	36

Postgraduate Institute on Pneumonia.—In Dr. J. G. M. Bullowa's discussion in the special article entitled "Postgraduate Institute on Pneumonia" in THE JOURNAL, Dec. 18, 1937, page 2058, about the middle of the second column, the sentence beginning "If a much more rapid flow, 80 liters a minute," should have read "8 liters per minute." Farther on in the same column the expression "alveolar air of a tent" should have read "alveolar air in a tent." Six lines from the end of this discussion the phrase "the hazard of fire from explosion" should be "hazard of fire from rapid combustion simulating explosion." On page 2062, first column, third paragraph, "Hooper" should be "Cooper." In the second column, fifth paragraph, on this page, add "with pneumococcus type II pneumonias" after the words "fifty-four patients." In the fourth line from the end of the seventh paragraph, "5 cc." should have been "0.5 cc." On page 2063, first column, third line from the end of the first paragraph, the words "heart's load" should be substituted for the word "heat."

Government Services

Director of Cancer Research Appointed

Carl Voegtlin, Ph.D., chief of the division of pharmacology in the National Institute of Health, has been appointed director of cancer research under the new program recently launched by the U. S. Public Health Service. Dr. Voegtlin has for several years been conducting research in cancer at the institute. A native of Basle, Switzerland, Dr. Voegtlin received the degree of doctor of philosophy from the University of Freiburg in 1902. Early in his career he taught chemistry at the University of Wisconsin and pharmacology and medicine at Johns Hopkins University School of Medicine. He joined the staff of the Hygienic Institute, now called the National Institute of Health, U. S. Public Health Service, Washington, D. C., in 1913.

Examinations for Regular Army Medical Corps

The War Department announces an examination March 14-18 for the purpose of qualifying candidates for appointment as first lieutenants in the Medical Corps, Regular Army, to fill vacancies occurring during the fiscal year 1939. The examination is open to all male graduates of acceptable medical schools who have completed one year's internship in an approved hospital and who will not be over 32 years of age at the time it will be possible to tender a commission. It will be conducted by boards of officers convened throughout the United States and will consist of a physical examination, a written examination in professional subjects and a determination of the candidates' adaptability to military service. Licentiates of the National Board of Medical Examiners may be exempted from the written professional examination. Full information and application blanks will be furnished on request addressed to the adjutant general, War Department, Washington, D. C. The final date for applications is February 26.

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Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 11, 1937.

Medical Preparation for a National Emergency

The British Medical Association has been requested by the Committee of Imperial Defense to compile a register of physicians who would be available for national work in the event of an emergency, which is defined as "a situation necessitating general mobilization and embodiment of the territorial army." It is added that "if and when the time comes, the needs of the civil population will be fully borne in mind." No physician is being asked to enter into any obligation. What is sought is a statement of present intentions. Physicians will be given a yearly opportunity to review their intentions. The statement of intentions will be regarded as confidential unless and until an emergency arises. A circular letter has been sent out to the honorary secretaries of the divisions of the British Medical Association. It is hoped to be able to indicate to the authorities how many physicians have expressed their willingness to serve in particular capacities in the event of emergency. Information will be made available as to the proportion of physicians of different ages—a matter on which no accurate knowledge exists at present. A classification of physicians into the following categories is proposed: 1. Those willing to accept whole time service at home or abroad. 2. Those willing to accept part time service at home. 3. Those willing to offer emergency service for the medical care of civilian casualties after air raids or bombardments (*a*) in any part of the country to meet a local emergency or (*b*) in their own areas. The inquiry will be conducted with regard to all physicians whether members of the British Medical Association or not. It is suggested that this responsible task should be entrusted to a specially selected physician, preferably a retired or semiretired one. It will be his duty to approach all physicians in the area of the division of the association so as to obtain from them a completed form of inquiry. He will keep the register up to the minute and invite physicians once a year to state whether they desire to change the statement of their intentions.

Tomography

Tomography is a new method of radiography which consists in the "sectioning" of an organ by x-rays, so that by successive images it can be analyzed into slices and a synthetized reproduction given. The method was conceived by Bocage in 1931 but has only recently been brought to practical realization. The x-ray tube and the film are coupled together by a pendulum or lever and moved during exposure in opposite directions. Objects within the body lying in the plane of the axis of rotation are sharply defined, while objects in other planes are blurred. Those nearest to the selected plane are least blurred, those furthest from it most blurred. By varying the extent of movement, one can investigate a plane of body tissue of any desired thickness. At the Section of Medicine of the Royal Society of Medicine, Dr. J. B. McDougall opened a discussion on the clinical value of the tomograph. He said that no department of medicine owed more to radiography than does diseases of the chest. The roentgenogram could convey more than any sign or group of signs. But the usual view, anteroposterior, lateral or oblique, left out much detail. In the interpretation of roentgenograms the superposition of the normal structures of the chest and of certain pathologic deposits introduced a difficulty. By tomography the different features of cases of pulmonary tuberculosis could be brought out. He had used the method for twenty-two months at Preston Hall (the village settlement for tuberculosis of the British Legion, of which he is director). He demonstrated roentgenograms showing the successive appearances at increasing distances from the front of the chest and drew attention to their value in the elucidation of cavities. They gave clear information of the nature of the cavity wall, the tissues around it and the relation to the bronchial tree. Most important was the evidence of separate cavities in the lung unsuspected so long as ordinary roentgenography was used.

Dr. E. W. Twining, radiologist, said that this method offered fascinating possibilities. Not the least valuable was its stimulus to learn anatomy afresh in a three dimensional way. Malignant bronchial obstruction could be diagnosed without the use of iodized oil. The method was useful also in the differentiation between malignant neoplasm and chronic abscess. It gave a better chance of investigating the wall of a cavity and the septums than any other method. The components of the mediastinum could be sorted out in a way not possible by ordinary roentgenography. Tomography was useful in the roentgenography of the skull. The ordinary anteroposterior view was confused by many overlapping shadows, which tomography resolved. Particularly well shown was the mass of bone that filled the temporomandibular joint.

Traffic Accidents

In spite of all attempts by the government to reduce traffic accidents by regulations, their number remains appalling. In the House of Lords the bishop of Winchester asked the government what further steps they proposed to take in order to reduce accidents. He said that on an average twenty persons were killed and 600 injured daily on the roads. In ten years the number killed was 66,000 and the number injured 2,000,000. About 20 per cent of the casualties occurred in children under the age of 15 and every day two of these were killed. In the debate it was stated that 60 per cent of the traffic exceeded the speed limit. The speaker said that he had personally been driven at 40 and 50 miles an hour in controlled areas (a penal offense) by physicians, lawyers, merchants and ministers of the crown. There was on the market a device for the carburetor which made it impossible to travel more than 30 miles an hour. For the government the earl of Munster said that it was deeply concerned over the high rate of road accidents. The difficulty of the problem was shown by the fact that on the roads were 2,750,000 motor vehicles and 8,000,000 cyclists, as well as many millions of pedestrians. In the last three years the figures for road accidents had shown a welcome tendency to remain steadier, notwithstanding a large increase in the number of vehicles. Large sums were being spent on the improvement of the trunk roads. The government accepted a proposal to appoint a committee to consider what steps should be taken to reduce the number of casualties on the roads and a motion to this effect was passed.

Change of Policy of Medical Journal with Regard to Abstracting

A radical change is to be made in the Epitome of Current Medical Literature of the British Medical Journal, which has existed in its present form for forty-five years. At a meeting of the council, Dr. R. G. Gordon, chairman of the Journal Committee, referred to the inevitable disadvantages of the abstracting method as it had been followed in the Epitome for many years. What appeared to be desirable was not so much a sheaf of abstracts of doubtful value as a key to what other journals contained. It is proposed to replace the Epitome by an eight-page Key to Current Medical Literature—a sort of weekly Index Medicus. It is felt that this will be of great value not only to the specialist and consultant but also to the general practitioner who is inclined to specialize or the partner in a firm of practitioners who takes one subject as his province. It is proposed to have four pages devoted each week to the general journals, giving the titles of the articles in

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English, with a short summary of not more than one or two of the more important articles in each particular issue. A second section of four pages will deal with special journals on similar lines and be divided into six categories in such a way that every one interested will know that once in a cycle of six weeks he will obtain a complete survey in the articles of his specialty. An incidental advantage will be that a large number of additional exchanges with other journals will be arranged.

In the discussion some skepticism was expressed as to the value of the proposal from the point of view of the general practitioner. To the specialist it was of value, but he was provided for already. It was suggested that it would be better to give a summary from time to time of a group of papers on a particular subject. The proposal was carried by a large majority.

PARIS

(From Our Regular Correspondent)

Dec. 11, 1937.

Allergy Following BCG Vaccination

A paper on tuberculin allergy following parenteral BCG vaccination was read by Weill-Halle and Sayé at the October 5 meeting of the Société médicale des hôpitaux de Paris. The clinical study of tuberculosis has shown the severity of extensive contagion in nonallergic individuals, especially during infancy and adolescence and among young adults. The mortality in cases in which segregation has not been possible has been from 2 to 3 per cent, whereas in those not so exposed to contagion the mortality has been minimal. It seemed desirable to ascertain whether the BCG when given by the parenteral route could allergize recently vaccinated persons, whether it could render allergic those who did not react to tuberculin and, finally, when the allergy was manifest.

A series of nurslings, isolated from all possible tuberculous contagion, was studied. It was found that injection of the BCG vaccine, i. e., parenteral administration, produces allergy after intervals which vary according to the dose employed and some idiosyncrasies which it is impossible to foretell. Small doses, e. g., 0.04 mg., produce allergy in from seven to eight weeks, practically without nodule or abscess formation. Larger doses allergize in from three to four weeks and in a fourth of the cases are followed by abscess formation of mild character. If the intradermal method is used, the allergy takes place rapidly with minimal reactions. The existence of allergy is more easily ascertained by the intradermal method, permitting positive reactions to be found, from one to three weeks before a positive epidermal reaction is evident. The appearance of the allergy is gradual, the reactions being doubtful or feebly positive and then quite marked in from one to three weeks. A period of from three to four weeks can be said to be the average of evidence of fixation of the BCG vaccine in the organism. If protection of the infant is desired up to the point of full development of the allergy, a delay of from two to three weeks should be allowed, after appearance of the first reaction.

Meningitis Cured by the Meningococcus Endoprotein of Reilly

A case was reported by Cattan and Fort at the October 22 meeting of the Société médicale des hôpitaux de Paris which aroused a great deal of discussion on the value, in general, of the serum treatment of cerebrospinal meningitis. The patient was a woman, aged 39, who presented a typical meningitis syndrome and the meningococcus B was found, by culture, in the spinal fluid. A total of 1,285 cc. of antimeningococcus serum was given subcutaneously and intraspinally. She was also given one injection of antistreptococcus serum (Vincent) because it had been reported by another laboratory that streptococci had been found in the spinal fluid at a later puncture. Blood cultures at a period when severe joint pains were complained of were positive for meningococci. The condition of the patient appeared so desperate on the forty-fifth day that it was decided to give 0.5 cc. of meningococcus endoprotein (Reilly) by the intramuscular route and 0.25 cc. intraspinally. After a severe temperature reaction lasting two hours, a marked improvement was noted on the following day with a progressive recession of the meningeal symptoms. The authors stated that the failure of the antimeningococcus serum was in part due to the fact that the intraspinal method of injection was employed only after the fourth day and then, at first, only in irregular and weak doses. The serum was, however, given in large doses by the intramuscular and subcutaneous routes. Later, the serum given in large doses intraspinally did not seem to change the clinical picture.

In the discussion, Apert reported the case of a girl, aged 14 years, who appeared to be convalescent following antimeningococcus serum treatment when a series of chills every third day, accompanied by purpura, appeared, during which attacks the meningococcus was found in the blood cultures. Antimeningococcus serum was given but appeared to have no influence on the pseudomalarial attacks. After three injections of the Reilly meningococcus endoprotein, no further attacks were observed.

Lemierre stated that at the present time serotherapy alone did not suffice in the treatment of cerebrospinal meningitis because doubt exists as to the efficacy of the serum. There can be no question that it ought to be given immediately in every case but it often fails to cure; hence it should be discontinued if the symptoms are not seen to recede. If the serum acts it does so very rapidly, and, if it is noticed that there is no amelioration, no time should be lost in resorting to the endoprotein therapy, sulfanilamide or acriflavine. The first named had been successful in cases in which the serum had failed after being given for over a month. A single injection will often suffice, but it should never be given unless the patient has previously received the serum intraspinally.

Lesne said that it is difficult to form an opinion as to the value of the serum because the prognosis in children varies according to the age and according to seasons. If no improvement is noted after four or five injections, serotherapy can be considered as of no value in the specific case. Subcutaneous injection of serum can be continued but no further serum should be given intraspinally. Lesne had not seen any cures from endoprotein in children. In general, one has the impression that the antimeningococcus serotherapy is less efficacious at the present time and that the essential feature is the value of the lumbar puncture itself. Serotherapy should be given for several days but lumbar puncture alone is indicated as long as the fluid is purulent.

Marquezy had observed both cures and failures with serum treatment. If two or three injections have not been followed by cessation of symptoms, it is better to discontinue the serum. The endoprotein treatment ought not to be given from the onset. The patient ought to be given an intradermal endoprotein test, which must be positive, before the endoprotein treatment is begun.

Hallé formerly believed that the serum treatment could be expected to be invariably successful, but he had encountered some cases that were resistant. The serum should be given a fair trial but, if it failed, endoprotein therapy was indicated.

Rist maintained that variations in the results of serum administration had been noted. During the World War he had observed some brilliant results, and if the serum was not effective in some cases it might be explained as due to a difference in the strain of meningococcus involved.

Jausion was of the opinion that a mixed infection or variations in the virulence of certain strains of meningococci might explain the failure to respond to serum treatment.

Massary agreed with some of the previous speakers that there appeared to be a seasonal variation in the disease which

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affected the serum results, and he had observed a succession of cures for several years and then failures in another year.

Le Bourdelles cited statistics of the disease as observed in the French army. Before the World War the mortality was 24.5 per hundred soldiers; during the war it rose to 29.07 and from 1920-1929 it was still higher, 36.67. The only way to explain this was that in recent years the incidence of meningococcus B infection was more common. This organism gave rise to septicemic forms and was much more seroresistant. Meningitis is a much more serious disease among the colonial troops than in soldiers born in France.

Lemierre, in discussing these army statistics, said that the fact that a patient who had been given serum treatment recovered could not always be ascribed as being due to the serum alone. He had often had occasion to see patients the serum treatment of whom had not been successful but who finally recovered, some spontaneously after a protracted convalescence, others following the use of the Reilly endoprotein. At present, in spite of identification of the type of meningococcus and the use of a specific serum, sudden improvement is not the rule as it was formerly, no matter whether the A or the B strain of meningococcus was involved. It is possible that encapsulated foci may be the cause of these failures. The mortality during 1934 in the department of the Seine was 47 per cent in spite of serotherapy. Nevertheless, he wished to emphasize the necessity of invariably beginning treatment by intraspinal and subcutaneous use of the serum as soon as possible. The type should be identified and a specific serum given. If there was no result after three or four injections, it was useless to continue the serum treatment.

Medal for Harvey Burkhart of the Eastman Foundation

In recognition of his services in the Eastman Foundation, which has recently placed in operation a large dental clinic in Paris for the treatment of children, the Assistance publique has given a gold medal to Harvey Jacob Burkhart of Rochester, N. Y. The clinic is housed in a new building and is located in a densely populated portion of Paris. Similar clinics have been installed by the Eastman Foundation under the supervision of Dr. Burkhart in other European capitals.

BERLIN

(From Our Regular Correspondent)

Nov. 22, 1937.

Developments in the National Health Movement

The first "National Congress of the German National Health Movement" was held recently at Düsseldorf. In attendance were several thousand members of German societies which advocate living habits and medical practice in conformity with nature. This movement is not to be underrated since, besides numbering among their membership 6,000,000 German citizens, these societies are not only whole-heartedly recognized but actively encouraged by the highest political authorities. This assembly provided many characteristic sidelights on the development of the movement. The feeling that any disparagement of "school" medicine and the regular physician's calling is certain to arouse among various elements was amply manifested by the cheers that greeted several of the addresses. On the other hand, quite a few of the men identified with the nature movement have adopted a more conciliatory attitude toward regular medicine with a view to the consolidation of a "National Health Front." It is obvious then that differences of opinion as to future programs of expansion are present within the nature cure movement itself. Kees, director of the league of heilpraktiker (lay practitioners), spoke in a characteristic manner. All regular medical procedures, he said, were products of the "bare" intelligence, whereas the procedures of nature medicine were rooted in the soul, in the emotions. Moreover, one should thank a higher providence that all the founders of popular medicine were Germans, whereas school medicine is of international origin.

So despite an appeal for the unity of heilpraktiker and physicians, the foregoing amply illustrates the gap that has to be bridged.

The entire proceedings pivoted about an address by the national führer of physicians, Dr. Wagner. He prefaced his remarks by saying that, as a part of the profound change which has taken place in all spheres of life under the Nazi régime, the concept of medical science too has undergone modification. The newer ideology has not halted before the sacred gates of the universities, it has invaded the very strongholds of German medicine. Public health policies in the past had been dominated by the principles reflected in such a slogan as "all is the same that bears a human face," which is tantamount to saying "It makes no difference whether he [namely, the individual person] is a German, a Jew, or God knows what." And as to that other outmoded catchword "The right of the human being over his own person," this "right" has been superseded by the higher prerogatives of the nation. Each citizen is duty bound to cultivate in his daily life a sense of responsibility not to himself alone but to family and country as well. Dr. Wagner then discussed several general problems which have frequently been mentioned in these letters. With regard to the heilpraktiker he said among other things that it was a matter of indifference to him whether a sick person sought out a doctor or a heilpraktiker. Particular movements such as kneippism, homeopathy and Felke-ism had each of them a legitimate *raison d'être*. It had never occurred to him to make use of his position to propagandize in the interest of any one school. The ranks of the heilpraktiker should be purged of certain unscrupulous elements if they ever expect to be recognized by the medical profession. Lay practitioners who have been active for some time and who can satisfy "medical and political requirements" ought to be specially licensed. There should be an end of the so-called freedom to practice medicine (kurierfreiheit). Dr. Wagner failed to state just what he would consider the "medical" prerequisites of a heilpraktiker. If the foregoing measures were adopted, the heilpraktiker would form a so-called compulsory organization. Each lay practitioner should be required to pass an examination on his ability to cure disease. Nothing was said of an examination in scientific knowledges of any kind. By and large, the heilpraktiker should enjoy rights similar to those of the physician (with exceptions in the fields of surgery and obstetrics). But it would be improper, for example, for lay practitioners to undertake microscopic studies. No younger group of heilpraktiker should be trained according to any one system. Existing schools for lay practitioners should concern themselves only with the necessary graduate training for already licensed heilpraktiker. One should of course recognize the healing powers of certain persons who do not possess university training, but these will be isolated individual instances.

Dr. Wagner went on to discuss the training of a physician. He mentioned the fact that few chairs of nature medicine have been created at the universities. Therefore in the interest of the new movement he has founded a group of hospitals exclusively for the practice of nature medicine and he contemplates the foundation of others. Wagner has renounced as hopeless any attempt to convert the older doctors to a newer credo. One has to begin with the young men. It will be possible, in a time not far off, to set up a new, more unified and single-minded medical profession. Dr. Wagner's concluding remarks were also of interest: When the heilpraktiker will have received official recognition the time will be propitious for his admission to panel practice as co-equal with the insurance physician. The following characteristic statement brought the address to a close: "At the present time a doctor can hardly be blamed if he regards 'heilpraktiker' as a synonym for 'quack.'"

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The magnitude of the heilpraktiker problem was further exemplified in a statement by Kees, the national führer of the heilpraktiker. In one month's time, he said, some 500,000 citizens come to the heilpraktiker for treatment. Among this number are 100,000 members of private sickness insurance clubs and 230,000 members of compulsory clubs, all of whom are entitled to the gratuitous services of the doctor and the pharmacist but who have to pay the heilpraktiker. The rest of the 500,000 citizens carry no sickness insurance.

In conclusion, two recent legal decisions should be mentioned. In the first case a heilpraktiker was convicted of fraud and extortion and sentenced to four and one-half years in jail and forbidden to practice for five years. The defendant, a former locksmith, had prescribed and sold at an exorbitant price to his patients during 1934-1936 an alleged "radium medicine." Although sealed up in ampules that reposed in pretentious packages, the substance consisted of nothing more than an inexpensive solution of iodine. This crook had preyed on needy persons in particular and had forced them to pay bills for sums as high as 500 marks. Nevertheless the court held that the offenses were not felonious in character; hence the jail sentence instead of a pentitentiary sentence. This conviction was a blow to the legitimate heilpraktiker.

In the other case a nature cure practitioner was charged with manslaughter through criminal negligence. This man had used mud packs in treating a breast tumor in a female patient. A surgical diagnosis of sarcoma was later established. The patient died after the third operation. The defendant was acquitted, the court holding as follows: At the time the defendant first observed the tumor he had not recognized it as malignant; furthermore, no evidence had been adduced to show that the mud pack treatment was in any way responsible for the fatal outcome.

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New Research Centers

In November the senate of the Kaiser-Wilhelm Gesellschaft voted the foundation and acquisition of several research institutes. Largest of these will be a new Kaiser-Wilhelm Institute of Biophysics at Frankfort-on-the-Main. Professor Rajewski, well known for his work in physical therapeutics, has been appointed director. In addition to this entirely new institute the Gesellschaft has taken over two other centers: one for the study of bast fiber, located at Sorau, and the other an institute of animal husbandry sponsored by the national food ministry. The activities of the last named institute will supplement the work of the well known Müncheberg center, which consists chiefly of research on plants. The new institute of animal husbandry will be a national center for studies of foddering, climatic and racial influences, heredity and so on. Constant collaboration with leading centers for research in genetics, biology and related fields will enable the new institute to carry on the most complicated practical functions.

New Symbol for the Public Health Service

As is known, German pharmacies used frequently to display as a symbol of the pharmacist's profession a red cross in a white field. But the drogerien, namely, shops other than regular pharmacies which deal in pharmaceutical goods, were not permitted to use this device and therefore often displayed a white cross in a red field. The latter device happens to be the official escutcheon of Switzerland so, following an international agreement, its commercial use has for some time been prohibited in Germany. As a substitute the German drogisten, that is, the proprietors of the drogerien, have adopted a stylized red mortar in a white field. The device of the German pharmacists' association consists of the letter A (for apotheken) together with a manes-rune, both red in a field of white. Other proposed color schemes, particularly black on a white field, have not found favor.

The health division of the national work service has until recently used the caduceus as its symbol. Now it has adopted a life-rune, symbolical of a belief in the immortality of the German nation.

Professor Nocht 80 Years Old

Prof. Dr. Bernhard Nocht of Hamburg completed his eightieth year November 4. Nocht enjoys an international reputation by virtue of his great contributions to tropical medicine. As a youthful assistant he worked for several years under Robert Koch in Berlin. In 1892, the cholera year, Nocht came to Hamburg as medical officer of the port and there in his first independent capacity he organized the maritime health service. His greatest achievement was the realization of his plan for an Institute for Research on Maritime and Tropical Diseases at Hamburg. The institute was founded in 1900 and under Nocht's leadership its activities were steadily expanded. Nocht made many voyages to the tropics in the interest of campaigns against disease and research investigations. Among other things he introduced the smaller dosages of quinine in the treatment of malaria. Modern research on beriberi received its initial impetus from Nocht's work on ship beriberi.

VIENNA

(From Our Regular Correspondent)

Nov. 26, 1937.

Data on Insanity in Vienna

The largest of Austrian hospitals for mental cases, the Vienna Steinhof, recently celebrated the thirtieth anniversary of its foundation. On this occasion some interesting data were published. In the earliest years of its existence the hospital admitted about 3,000 new cases per annum. During the war year 1916 more than 4,000 new patients were admitted, subsequently the number declined to 2,100 (in 1919) and then again it rose slowly until a peak of 5,078 was reached in 1931. More recently the patient population has averaged around 4,200. The number of alcoholic patients admitted was highest in 1929, namely, 41.6 per cent of all patients admitted; after that year the proportion fell steadily to 21 per cent (in 1936). There has also been a striking decrease in the number of cases of dementia paralytica. This disease reached a peak in 1910, for in that year 18.5 per cent of all new patients were affected with it. Thanks to the introduction of Wagner-Jauregg's malaria therapy, this proportion fell to less than 6 per cent. It is interesting to note the distribution of the patient population according to sex. In the last ten years the proportion of newly admitted male patients at the Steinhof (which properly speaking is the only institution of its kind in Vienna) would have been expected to increase; actually it has changed but little, oscillating about the figure 2,200 (between 1,900 and 2,500). The number of female patients admitted has, on the contrary, undergone an absolute increase from 1,648 in the year 1926 to 2,176 in 1936, an increase of more than 30 per cent. One fact may be concluded from the foregoing figures, an increase in the "female" psychoses. If these absolute figures are, however, compared with the total number of men and women in the Viennese population, it will be seen that the percental proportion fluctuates but little. Each year some 2.9 per cent of the entire male population and some 1.9 per cent of the entire female population are placed in "detention" on account of mental disorders. Even the complexion of the entire population of Vienna is changing in the direction of an increased number of women. Of like interest are some facts about the hospital itself: The Steinhof opened its doors in 1907 and was considered at that time the largest and most important institution of the kind in the entire world. The total area occupied by the plant exceeded 1.5 square kilometers (more than 400 acres). The original costs entailed by the hospital's establishment exceeded $5,000,000 (gold). The arrangement and equipment of the plant reflected the most advanced principles of

psychiatric research and therapy. Architecturally the pavilion system was utilized; there were twenty-five pavilions, each equipped with social rooms and theaters—in 1907 unheard of innovations for an insane asylum. New patients are classified as quiet, fairly quiet, or restless and assigned to a particular pavilion on the basis of this classification. Each new inmate first undergoes a detention period of from twenty-four to forty-eight hours in the observation ward before being assigned to the appropriate pavilion. In 1929 a new unit was opened at the Steinhof for the sole treatment of alcoholism. Many different methods of abolishing the drink habit are here utilized. A bureau for the supervision of alcoholic outpatients has also been established. It attempts to prevent retrogression of patients who have been discharged as cured and to expedite the readmission of recidivants. Occupational therapy is carried on in work shops, with which most of the pavilions are provided. Rug weaving, manufacture of dolls and gardening are among the occupations engaged in by the patients. The hospital's personnel includes beside the director (Professor Dr. Mauczka), twenty-five doctors, twenty clerical employees, 600 male and female nurses, dietitians, orderlies, ward maids and so on, eighty-one technicians, forty persons employed in the kitchen and fifty-five in the laundry.

Therapy of Thrombosis in Obstetric Cases

At the last session of the Gesellschaft der Aerzte, Dr. Friedländer of the Women's Hospital discussed the management of justly dreaded thrombotic conditions, which are especially apt to menace a patient toward the end of pregnancy and in which lurks the danger of embolism. The methods outlined by Dr. Friedländer are those regularly utilized in his service as well as in the clinic of internal medicine. Previously cesarean section had often been performed in dangerous cases as a means of avoiding the bodily movements and compression incident to labor. Friedländer, however, after careful experimentation with animals, decided that a thrombus may best be localized on the wall of the vein and untoward incidents forestalled by means of the following procedure: Instead of keeping the patient in a state of rest in bed, an intensive, systematic movement therapy is employed; the movements of the trunk and extremities bring an actively forming thrombus into intimate contact with the venous wall and a coalescence with the endothelium takes place, since the membrane is extremely sensitive to pressure. Accordingly, if a thrombus is detected in a gravid woman the initial step to be taken is negative: the patient is forbidden to lie in bed except during the regular sleeping hours. The pain that usually inclines the patient to seek her bed is best relieved by compression bandages. In this way the thrombus becomes fixated within a few days time and the woman can await confinement without anxiety. Patients who already enter the hospital as bedfast are furnished the compression bandage and then mobilized by systematic movement exercises. Dr. Friedländer presented women patients who had been admitted to his service suffering from acute thromboses in the pelvic vessels, the femoral vein and the vein of the lower leg. Yet following introduction of the new type of management these patients were, in a few weeks time, brought to normal delivery. Thus far he has seen nine such cases and twenty-five additional cases in which the patients became ill with acute thrombophlebitis "in puerperio." As a rule, from five to ten days of treatment is required before the free, uninhibited mobility of the patient is attained; in one case it took as long as three weeks. Nonobstetric cases (both gynecologic and internistic) in which thrombi appear run a similar course. Treatment usually lasts from five to fourteen days. Friedländer treated a total of eighty-four cases of thrombosis by his own method; in none of these did infarction take place. Naturally, in severe cardiac complications a therapy of movement should be introduced with the utmost caution or may be contraindicated. In the discussion Dr. Holler stated that thirty patients (seven men, twenty-three women) in his own internistic service had received Friedländer's treatment; usually all these patients were seriously ill. Holler cited in particular the case of a woman, aged 46, who on admittance presented thrombosis in the pelvic vessels and infarct pneumonia. These conditions had proved refractive to all the older types of therapy and new emboli continued to form. Finally a course of movement therapy was decided on in spite of the patient's poor general condition and the cardiac myodegeneration. Treatment was begun while the patient remained in bed. Soon she was permitted to sit up in bed, then to sit up out of bed and later to walk about. In fourteen days she had become completely ambulant and was soon discharged as cured. Holler also reported the case of a woman, aged 78, who presented bilateral thrombosis in the deep femoral veins and who was quickly "mobilized" and discharged in three weeks completely cured. Dr. Knoflach has utilized "Friedländer's method" of mobilization in his own surgical service for the last eighteen months and almost completely foregone the conservative management. He stressed the advantages of the new therapy, notably the abbreviation of the period required for treatment, and the relative safety. Wherever the new method is followed, the "phlegmasia alba dolens" of earlier times is no longer seen. Mobilization induces improved pulmonary aeration and this in turn is a dominant factor in the abolishment or arrest of any existing inflammatory infarction.

Students Protest the Lengthening of Period of Study

Not long ago the Ministry of Education decreed that the revised medical curriculum should be instituted at an earlier date than that envisaged by the original plan. In particular it was decided to impose the requirement of the so-called hospital year (namely, a compulsory unremunerated year's activity at a hospital prior to the award of the doctor's degree) during the current academic year instead of later. A large number of the student body protested vociferously against this new decision, which they regarded as an arbitrary and unforeseen prolongation of their period of training. Vienna University was the scene of so much unrest in this connection that classes were forced to suspend for several days. The less hot-headed elements among the student body were able, however, speedily to effect a compromise with the authorities. It was agreed that the new ordinance would first become effective in July 1938 and that only a six months hospital internship would be required of medical students who are now in their final year. It was also agreed that the members of this class would receive their doctoral degrees on completion of the regular academic curriculum and begin their hospital training as full-fledged physicians. The younger students, however, must complete a full year's hospital duty before receiving their final degrees.

Marriages

DANIEL GEORGE MELVIN, Greystone Park, N. J., to Miss Mary Catherine Donihee of Morristown, at Larchmont, N. Y., Oct. 16, 1937.

CHARLES S. PENNYPACKER, Ardmore, Pa., to Miss Marguerite Harrison Colwell of Cynwyd, Nov. 20, 1937.

JOHN FRANCIS MCGUIRE JR., Washington, D. C., to Miss Rita Mary Connors in Miami, Fla., Sept. 18, 1937.

LEON F. HUTCHINS, San Angelo, Texas, to Miss Nan Mabel Lord of Nashville, Tenn., in November 1937.

GLENN DEVERE CARLSON, Dallas, Texas, to Miss Lorraine Frances Manske of Sagerton, Dec. 6, 1937.

GEORGE W. BENNETT, Elsie, Mich., to Miss Louise Wilbur of Greenbush Township, Nov. 25, 1937.

MILTON E. BITTER to Miss Alberta A. Kindred, both of Quincy, Ill., in November 1937.

JOHN N. SNYDER, Chestnut Ridge, Pa., to Miss Helen Gans of Uniontown, Sept. 3, 1937.

Deaths

Elmer Ellsworth Hagler, Springfield, Ill.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1890; member of the Illinois State Medical Society and the American Academy of Ophthalmology and Oto-Laryngology; fellow of the American College of Surgeons; past president of the Sangamon County Medical Society; member of the advisory board during the World War, and district chairman of the National Council of Defense; at one time demonstrator of ophthalmic and aural surgery and clinical ophthalmology and otology at his alma mater; aged 74; on the staff of St. John's Hospital, where he died, Oct. 17, 1937.

Harvey Parker Towle ✠ Newton, Mass.; Harvard University Medical School, Boston, 1892; member and past president of the American Dermatological Association and the New England Dermatological Society; at one time professor of dermatology at the Dartmouth Medical School, Hanover, N. H., instructor of dermatology at his alma mater and lecturer at the school of hygiene, Wellesley College; at various times on the staffs of the Boston City Hospital and the Massachusetts General Hospital, Boston; aged 70; died, Oct. 7, 1937, of cerebral hemorrhage.

Solomon Leon Cherry ✠ Clarksburg, W. Va.; University of Maryland School of Medicine, Baltimore, 1908; fellow of the American College of Physicians and member of the American Society of Clinical Pathologists; past president and secretary of the Harrison County Medical Society; served during the World War; pathologist to St. Mary's Hospital; formerly bacteriologist to the city of Clarksburg health department; aged 50; died, Oct. 21, 1937.

J. Paul Ernest Bousquet, Montreal, Que., Canada; School of Medicine and Surgery of Montreal, Que., 1906; professor of clinical ophthalmology and otorhinolaryngology at his alma mater; member of the American Academy of Ophthalmology and Oto-Laryngology; fellow of the American College of Surgeons; chief of service, Hôtel Dieu Hospital; aged 57; died suddenly, Oct. 27, 1937.

Stuart Avery Campbell ✠ Norfolk, Neb.; Medical Department of Omaha University, Omaha, 1898; member of the Associated Anesthetists of the United States and Canada; fellow of the American College of Surgeons; past president of the Sioux Valley Medical Society; aged 63; died, Oct. 19, 1937, of heart disease.

George Williams, Independence, Mo.; University Medical College of Kansas City, Mo., 1896; formerly superintendent of the Research Hospital, Kansas City, and the State Hospital, Blackfoot, Idaho; aged 78; died, Oct. 16, 1937, in the Independence Sanitarium and Hospital, of cerebral hemorrhage.

George Francis Adams, Kenosha, Wis.; Hahnemann Medical College and Hospital, Chicago, 1888; member of the State Medical Society of Wisconsin; aged 74; on the staff of the Kenosha Hospital, where he died, Oct. 10, 1937, of injuries received in a fire which was started by a cigaret.

Heman Baker Chase, Westfield, Mass.; Harvard University Medical School, Boston, 1908; member of the Massachusetts Medical Society; served during the World War; assistant superintendent of the Westfield State Sanatorium; aged 56; died, Oct. 11, 1937, of heart disease.

William Jeffries Chewning, Fredericksburg, Va.; University College of Medicine, Richmond, 1900; served during the World War; aged 60; died, Oct. 28, 1937, in the Walter Reed General Hospital, Washington, D. C., as a result of a stone impacted in the common bile duct.

Leonard E. Welch, Albany, Ga.; University of Pennsylvania Department of Medicine, Philadelphia, 1893; member of the Medical Association of Georgia; formerly on the staff of the Phoebe Putney Memorial Hospital; aged 71; died, Oct. 3, 1937, of chronic infectious arthritis.

Silas James Alexander, Hearne, Texas; Southwestern University Medical College, Dallas, 1909; member of the State Medical Association of Texas; member of the board of health and president of the board of education; aged 55; died, Oct. 31, 1937, of cirrhosis of the liver.

Thomas Joseph Burke, Elmira, N. Y.; University of Buffalo School of Medicine, 1910; formerly on the staffs of the Arnot-Ogden and St. Joseph's hospitals, Elmira, and the Tioga County General Hospital, Waverly; aged 51; died, Oct. 19, 1937, of carcinoma of the tongue.

Stella Mary Taylor, Boston; Woman's Medical College of Pennsylvania, Philadelphia, 1888; Trinity Medical College, Toronto, Ont., Canada, 1889; for many years superintendent of the New England Hospital for Women and Children; aged 80; died, Oct. 13, 1937.

Louis Napoleon Delorme, Montreal, Que., Canada; Laval University Medical Faculty, Montreal, 1886; professor of practical anatomy at the University of Montreal Faculty of Medicine; aged 75; on the staff of the Notre Dame Hospital, where he died, Oct. 3, 1937.

Federico D. Campos, Tacloban, Leyte, P. I., University of Santo Tomas College of Medicine and Surgery, Manila, 1932; member of the Philippine Islands Medical Association; formerly secretary of the Leyte Medical Association; aged 32; died, Aug. 29, 1937.

Theodore C. McQuate, Massillon, Ohio; Toledo Medical College, 1902; member of the Ohio State Medical Association; for many years county coroner; aged 65; on the staff of the Aultman Hospital, Canton, where he died, Sept. 23, 1937, of cerebral thrombosis.

William Franklin Betts ✠ Evergreen, Ala.; Tulane University of Louisiana Medical Department, New Orleans, 1892; secretary of the Conecuh County Medical Society; at one time city physician, county health officer and coroner; aged 66; died, Oct. 29, 1937.

George Herbert Williams, Haverford, Pa.; L.R.C.P., Edinburgh, 1883, and M.R.C.S., England, 1884; Yale University School of Medicine, New Haven, Conn., 1891; aged 77; died, Oct. 6, 1937, in the Bryn Mawr (Pa.) Hospital, of cerebral hemorrhage.

Isaac W. Amerman, Nevada, Mo.; University of Louisville (Ky.) Medical Department, 1880; member of the Missouri State Medical Association; owner of the Nevada Medical and Surgical Sanitarium; aged 86; died, Oct. 19, 1937, of coronary thrombosis.

De Witt Talmage Smith ✠ Dallas, Texas; Vanderbilt University School of Medicine, Nashville, Tenn., 1914; served during the World War; medical director of the Southwestern Life Insurance Company; aged 49; died, Oct. 2, 1937, of heart disease.

Charlotte Le Breton Johnson Baker, Point Loma, Calif.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1881; member of the California Medical Association; aged 82; died, Oct. 31, 1937, of nephritis and myocarditis.

John W. Werner, Newkirk, Okla.; College of Physicians and Surgeons, Medical Department of Kansas City University, Kansas City, Kan., 1897; aged 74; died, Oct. 12, 1937, in a hospital in Chicago, of myocarditis and arteriosclerosis.

William Robertson Watson, Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1908; for many years on the staffs of the Episcopal and Pennsylvania hospitals; aged 67; died Oct. 25, 1937, of heart disease.

Vincent Gaudiani, New York; Regia Universita degli Studi di Roma, Facolta di Medicina e Chirurgia, Italy, 1898; fellow of the American College of Surgeons; on the staff of the Broad Street Hospital; aged 63; died, Oct. 8, 1937.

John Franklin Scribner, Sceptre, Sask., Canada; Queen's University Faculty of Medicine, Kingston, Ont., 1898; Manitoba Medical College, Winnipeg, Manit., 1911; aged 77; died, in October 1937, of bronchopneumonia.

Wellington B. Coffeen, Miami, Fla.; Hahnemann Medical College and Hospital, Chicago, 1884; Chicago Homeopathic Medical College, 1884; aged 78; died, Oct. 17, 1937, in a local hospital, of injuries received in a fall.

Adam Stephan Rockafield, West Lafayette, Ind.; Jefferson Medical College of Philadelphia, 1869; aged 90; died, Oct. 22, 1937, in St. Elizabeth Hospital, as the result of an injury received in a fall from a tree.

Lester H. Botkin, Duquesne, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1888; member of the Medical Society of the State of Pennsylvania; aged 80; died, Oct. 16, 1937, of coronary occlusion.

Edward Davis Moffett, Berkeley, Calif.; Central College of Physicians and Surgeons, Indianapolis, 1886; aged 75; died, Oct. 3, 1937, of chronic interstitial nephritis, arteriosclerosis and cerebral hemorrhage.

George Bertie Kennedy, Seabright, N. S., Canada; Western University Faculty of Medicine, London, Ont., 1901; served with the Canadian Army during the World War; aged 62; died, Sept. 9, 1937.

Walter May Blowers, Portland, Ore.; Northwestern University Medical School, Chicago, 1905; aged 57; died, Oct. 25, 1937, in the Portland Sanitarium, of hypertension, gastric ulcer and bronchopneumonia.

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Traian Thomas Benchea, Wheeling, W. Va.; Indiana University School of Medicine, Indianapolis, 1934; aged 39; on the staff of the Wheeling Hospital, where he died, Oct. 30, 1937, of bronchopneumonia.

David Milton Cook, Craig, Colo.; Keokuk (Iowa) Medical College, College of Physicians and Surgeons, 1901; aged 64; died, Oct. 6, 1937, at the Solandt Memorial Hospital, Hayden, of coronary thrombosis.

John I. Chorlog, Madison, Wis.; University of Wisconsin Medical School, Madison, 1927; aged 34; died, Oct. 18, 1937, in the Madison General Hospital, of an injury received in an automobile accident.

Henry C. Clark, Falmouth, Ky.; Medical College of Ohio, Cincinnati, 1874; formerly county health officer, member of the city council and mayor of Falmouth; aged 89; died, Oct. 31, 1937, of pneumonia.

James Archer Riley, Cleveland; Jefferson Medical College of Philadelphia, 1886; aged 75; died, Oct. 6, 1937, in the Cleveland Clinic Hospital, of arteriosclerosis, heart disease and bronchopneumonia.

William A. Riegel, Catasauqua, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1889; member of the Medical Society of the State of Pennsylvania; aged 73; died, Oct. 5, 1937.

Charles Edwin Rich ✠ Lynn, Mass.; Baltimore Medical College, 1902; on the staffs of the Lynn and Union hospitals; aged 62; died, Oct. 2, 1937, of adenocarcinoma of the sigmoid.

James Waite Vidal, Fargo, N. D.; University of Michigan Homeopathic Medical School, Ann Arbor, 1882; aged 76; died, Oct. 5, 1937, following an operation for removal of bladder stone.

Hermon Wesley Small, Portland, Maine; University of Vermont College of Medicine, Burlington, 1890; member of the Maine Medical Association; aged 72; died, Oct. 8, 1937.

George Washington Bolkcom, Minneapolis; University of Minnesota College of Medicine and Surgery, Minneapolis, 1894; aged 70; died, Oct. 17, 1937, of cerebral thrombosis.

Robert Bunyan Ayer, Gainesville, Fla.; Meharry Medical College, Nashville, Tenn., 1900; aged 71; died, Oct. 29, 1937, of injuries received in an automobile accident.

Benjamin Lawrence Clayton, Pinson, Ala.; Vanderbilt University School of Medicine, Nashville, Tenn., 1883; aged 79; died, Oct. 23, 1937, of cerebral hemorrhage.

Alexander James Rudolf, Milwaukee; Northwestern University Medical School, Chicago, 1901; served during the World War; aged 59; died, Oct. 5, 1937.

Francis Sherwin Allen, Philadelphia; University of the City of New York Medical Department, 1886; aged 81; died, Oct. 15, 1937, of cardiovascular disease.

Edward Moses Bell, Cohoes, N. Y.; Albany Medical College, 1893; health commissioner of Cohoes; aged 70; died, Oct. 19, 1937, of chronic myocarditis.

Alexander W. Miller, New Waterford, N. S., Canada; Dalhousie University Faculty of Medicine, Halifax, 1905; aged 68; died, Sept. 11, 1937.

Ephrem Alphonse Marcoux, Fall River, Mass.; Baltimore Medical College, 1904; aged 56; died, Oct. 9, 1937, of pulmonary tuberculosis.

Albert John Reynolds, Mount Forest, Ont., Canada; Victoria University Medical Department, Cobourg, 1889; died in October 1937.

John Lewis Day, Westmount, Que., Canada; McGill University Faculty of Medicine, Montreal, 1895; aged 69; died, Sept. 12, 1937.

John Ulysses Day, Jacksonville, Ill.; Barnes Medical College, St. Louis, 1908; aged 55; died, Oct. 19, 1937, of dilatation of the heart.

William Vilas Bryant, McFarland, Wis.; Rush Medical College, Chicago, 1901; aged 61; died, Oct. 31, 1937, of chronic myocarditis.

Albert D. Chattaway, Buffalo; New York Homeopathic Medical College, 1885; aged 74; died, Oct. 23, 1937, of coronary thrombosis.

Wilmot Collins, Erie, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1900; aged 77; died, Oct. 14, 1937, of uremia.

Margaret Ruth Otis ✠ Los Angeles; Michigan College of Medicine and Surgery, Detroit, 1905; aged 57; died, Sept. 21, 1937.

Richard Guy Tunison, New York; Long Island College Hospital, Brooklyn, 1907; aged 57; died suddenly, Oct. 10, 1937.

Correspondence

THE METRAZOL CONTROVERSY

To the Editor:—In reply to, and as a companion communication to the one presented to THE JOURNAL Oct. 30, 1937, page 1470, by Dr. Joseph Wortis, the following points ought likewise to be presented to the medical profession:

1. In answer to the question posited to him as to who originated the convulsive therapy of schizophrenia, Dr. L. von Meduna published the article "Die Bedeutung des epileptischen Anfalls in der Insulin- und Cardiazolbehandlung der Schizophrenie" (The Significance of the Convulsive Reaction During Insulin and Metrazol Therapy of Schizophrenia), *Psychiatrisch-Neurologisthe Wochenschrift* **39**:331 (July 24) 1937. I had the pleasure of assisting in the translation of this article, which will appear in the *Journal of Nervous and Mental Disease* in a short time, and I quote here a few brief passages:

"On the basis of the publications of Sakel, and later of Dussik and Sakel, we conclude that:

"1. The insulin therapy evolved out of pure empiricism.

"2. The deliberate induction of the convulsive reaction is not the purpose of the insulin hypoglycemic therapy, inasmuch as there is no mention made of this in the above workers' publications, with the exception of the instance wherein an unsuccessful injection of camphor and cardiazol was given. From the case histories given . . . they had no intention of provoking convulsive reactions. On the contrary, these occurred unexpectedly in four out of one hundred and four cases, and were regarded as dangerous complications.

"3. The great majority of patients who undergo insulin therapy successfully reach a complete remission without undergoing a single convulsive seizure. This is confirmed by a series of workers.

"Müller (Insulin and Cardiazol Shock Therapies of Schizophrenia, *Fortschr. d. Neurol.* **9**:131 [April] 1937) states: 'Sakel, Dussik and Sakel, Berglas and Susic, Kronfeld and Sternberg, and others as well as I have reported a number of cases in which complete remission occurred either in phase I—before the onset of any type of hypoglycemic reaction, or when the treatment was interrupted in the pre-coma stage—which must certainly be attributable to the therapy.' Obviously in the four cases published in which convulsive reactions had occurred, the association of the convulsive reactions with the ensuing remissions would not escape the attention of Sakel and Dussik. In the scope of the insulin therapy, however, nobody, as is evident from publications up to the present time, has attempted to draw conclusions from this source and to work upon it systematically. Only May of the Münsingen Institute has found that in some cases the convulsive crisis exerted a definite beneficial effect. However, in just as many instances no therapeutic effect whatsoever is noted. In the recent congress in Münsingen, Sakel practically endorsed these views as regards the convulsive reactions in the course of insulin therapy. The concepts of the cardiazol therapy are distinctly different. The theoretical basis for the therapy with cardiazol lies in the assumption that a certain biochemical antagonism exists between the convulsive state and the schizophrenic process. . . . It is effective only when a designated number of convulsive attacks can be provoked. . . . It is merely implied that the insulin method is a result of an inductive train of thought; in contradistinction, the cardiazol method is a deduction from a preconceived thesis."

The foregoing statement may be centrifugated to the following statement by Sakel (cited on page 10 of the monograph): "Of less frequent occurrence than the 'wet shock' is the definite somatic manifestation of a sudden, severe, convulsive seizure with tonic and clonic spasms, tongue biting and a weak pulse—very dangerous, *cave!*" With the more and more widespread use of metrazol and the induction of convulsive reactions per se, the technic of producing convulsions has been perfected and the use of the convulsive reaction as a therapeutic agent in schizophrenia is common knowledge—so much so that the "dry shock" of the insulin procedure is now rather openly called an epileptiform crisis.

2. If the issue of priority must be brought up for consideration, it might be well to note that in the field of mental disease

from time immemorial practically every physical and chemical means that has ever been used in general medicine has also been applied to the treatment of the mentally ill. Not long after insulin was introduced as a specific for diabetes, it was also employed empirically in the treatment of psychoses. Gyula Schuster, for example, used insulin in doses high enough to produce varying degrees of suspended consciousness up to the point of coma, wherein intravenous dextrose was necessary, and following this he noted improvements in the psychotic pictures. He would carry on this procedure for two or three months almost daily. In 1928 he reported sixty schizophrenic cases in which treatment was administered by this means, with considerable improvement in all of them (*Arch. f. Psychiat.* **85**:779, 1928). However, Schuster attributed these results to the "shocking" of the schizophrenic patient by producing severe physiologic alterations in the various organs, akin to anaphylactic reactions. In the true sense of the word, this was not so vitally different from the original theorizations of Sakel.

3. There is no reason why any scientist in any country should seek to avoid a controversy about therapeutic means. From the practical point of view, almost every controversy in the history of medical science has ultimately brought out helpful and valuable increments. This forecasting of a "metrazol versus insulin" conflict should in reality be awaited expectantly because medicine will be benefited. Furthermore, more patients will receive treatment for the purpose of justifying a therapeutic precept. With regard to the last statement, it is common knowledge among physicians who work with insulin therapy that a great portion of their working day and a considerable amount of hospital personnel are occupied in properly carrying out the insulin procedure for a relatively small number of patients. The factor of simplicity is no mean attribute of the metrazol therapy. It is noteworthy in the latter procedure that a physician with the help of a nurse can administer at least twenty-five treatments in the early part of the morning and for the rest of the day may perform routine hospital duties, that the only apparatus necessary is the syringe and the gag, and the present day results of the two therapies are equivalent. It is furthermore to be noted that just as many insulin failures respond to metrazol as metrazol failures do to insulin. The feeling, or fear, that the metrazol therapy will supersede insulin therapy is justifiable since simpler and more economical procedures will naturally be used first.

The factors of simplicity and rapidity that go along with the metrazol therapy ought to meet with the approval of serious-minded, far-seeing psychiatrists who could use this added time for purposes of reeducation of the patient by means of occupational, milieu and psychologic therapies—an important consideration, indeed, from the standpoint of the final outcome of the psychosis.

As to whether the two treatment procedures are compatible or antagonistic, no one can tell with certainty as yet. This problem will no doubt be solved after perhaps years of research. It has been recently advocated that patients who do not respond rapidly enough or favorably enough to insulin ought also to receive metrazol in combinations of some type or another. I wish to refer again to a quotation from Meduna and to remark that workers ought at least to know what factors are at play in each type of therapy before combining the work in "shotgun" fashion. It is urged that parallel case histories should be run to determine criteria whereby the individual case is better handled by one form of treatment or the other.

In closing it may be stated that I have discussed this point of view with a number of workers experienced in both fields. The consensus is that neither of these methods is a sine qua non—the finale of therapeusis is mental diseases. A great step has been made; controversy is helpful and instructive; much gainful work is laid out for the future.

EMERICK FRIEDMAN, M.D., Stony Lodge, Ossining, N. Y.

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Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

PROPHYLAXIS OF MEASLES

To the Editor:—There is now and has been for a few weeks an epidemic of measles in my community. Are the prophylactic preparations for measles generally accepted by the medical profession? The only one that I am familiar with is the one put up by Squibb, and I have never used that.

J. W. YOWELL, M.D., Duvall, Wash.

ANSWER.—Convalescent measles serum is a reliable prophylactic when given to susceptible children within three days of the date of exposure. The serum is administered intramuscularly in a single dose of from 5 to 15 cc. However, as this procedure confers only passive immunity, the protection lasts on an average only about ten days to three weeks, seldom longer.

Immune globulin, a human placental extract, is advocated by McKhann for the prevention or modification of measles. Lederle is among those who have this preparation on the market. For prevention, it is recommended that 2 cc. of immune globulin, human, be injected intramuscularly at the earliest possible moment after exposure to measles, and that a second dose of 2 cc. be given four days later.

Nevertheless, some clinicians believe that the value of immune globulin is uncertain for the purpose of prevention and that even if immediate protection does occur the immunity is very brief. The real worth of immune globulin presumably is its ability to modify measles and thereby lessen the danger of serious complications.

For modification of measles, immune globulin is injected intramuscularly in a dose of 2 cc. from "two to four days after the appearance of the rash in the exposing patient." It is believed that this plan will usually modify the attack of measles in the exposed child without preventing it. It is evident that, if immune globulin will modify an attack of measles without danger to the patient, such a plan is preferable to temporary complete immunity, which can be conferred by other means. A modified attack of measles is almost certain to insure a permanent immunity.

It should not be forgotten that a patient with modified measles is capable of transmitting unmodified measles to susceptible contacts. For this reason the modification method is not suitable in hospitals where it is desired to prevent cross infections.

ALCOHOL AND CORONARY DISEASE

To the Editor:—In a recent article published in THE JOURNAL, statements were made that people over 45 years of age who drank alcoholic beverages are less likely to develop coronary disease than total abstainers. Is this true? For one who drinks very little, how much would it be advisable to drink? Is it apt to produce tremor? Are tuberculosis, syphilis, prostatitis, sluggish gallbladder and gastric hyperacidity contraindications to the use of liquor?

M.D., New York.

ANSWER.—There is probably only a grain of truth in the statement that persons over 45 who drink alcoholic beverages are less likely than total abstainers to develop coronary disease. That grain of truth concerns the amount. True chronic alcoholism does appear to protect the victim in some way, perhaps because the heavy drinker often does have his periods of fasting as far as food is concerned, and rich food inadequately earned by exercise is commonly the habit in the case of persons with presenile coronary disease. However, these heavy drinkers are prone to fall into the hands of the medical examiners or coroners because of accidental deaths or to have serious disease of the liver, nutrition or nervous system to shorten their lives; it is the medical examiners who report finding the coronary arteries of such persons soft.

The moderate drinker or one who drinks only occasionally or but little is apparently not protected. In a series of 750 cases of angina pectoris (based on coronary disease) analyzed by White and Sharber (THE JOURNAL, March 3, 1934, p. 655) the ratio of drinkers to total abstainers was 35.6:64.4. Only one person, the longest survivor, was a heavy drinker. In a control series of 750 subjects without angina pectoris but of the same age and sex incidence and walks of life the ratio of drinkers to total abstainers was 38.3:61.7. Gallavardin has

found angina pectoris to be common among the moderate wine drinkers of the Rhone valley.

An entirely different aspect of the problem is the occasional beneficial therapeutic or prophylactic effect of rations of alcoholic beverages in cases of coronary disease with angina pectoris.

Certainly it would seem unwise for any person with tuberculosis, syphilis, prostatitis, gallbladder disease or gastric disorders or, in fact, for any person healthy or diseased to drink enough alcohol theoretically to protect himself from coronary disease.

AMENORRHEA AND HYPERTHYROIDISM—ENDOCRINE TREATMENT

To the Editor:—A white woman, aged 23, menstruated for the first time at the age of 12 years and for the following three years her menstrual periods were regular. At the age of 16 she first complained of symptoms which were interpreted as being due to hyperthyroidism, and a thyroidectomy was performed within six months. Two months prior to the operation she abruptly ceased menstruating, and at the same time generalized headaches, usually of one day's duration, began, accompanied by dizziness and at times vomiting. These headaches were present in the morning but did not interfere with her sleep. There were no prodromal symptoms and no regularity of occurrence. The headaches occurred on an average of once a week after their onset and have changed in no respect in seven years, and the patient has never menstruated during that time. She has now been married over a year, during which time no contraceptive measures have been used. I have attempted to reestablish menstruation. From April 13 to 23 the patient was given 2,000 units of theelin daily. April 23 and every third day since she has received in addition to the 2,000 units of theelin, 1 cc. of gonadotropic substance from pregnancy urine (antuitrin-S). To date there have been no indications of menstruation other than that April 20 she complained for one day of some tingling and fulness in the breasts. She has, however, had but one headache since the beginning of the regimen, and this was unusually mild, lasting less than three hours. I should like to know the probable cause of the amenorrhea and its relation to the headaches, the adequacy of my treatment to date, the length of time it should be continued and the probable prognosis as to reestablishment of menstruation.

M.D., Iowa.

ANSWER.—The effect of hyperthyroidism on menstruation is not constant. In many cases the menses are normal; in others they are irregular; in still others there is an entire absence of the monthly flow, and in a few there is profuse bleeding. In Brams's series of 2,000 cases of hyperthyroidism there was a history of normal menstruation in 31 per cent, of delay or irregularity in 43 per cent, of amenorrhea in 24 per cent and of menorrhagia in 2 per cent (*M. Times & Long Island M. J.* **62**:10 [Jan.] 1934).

The relation between the amenorrhea and the headaches is not clear. It is hardly likely that the absence of the menses is the cause of the headaches. More likely the amenorrhea and the headaches are due to the same cause.

Amenorrhea in the absence of disturbing symptoms does not call for treatment, especially because it is difficult to overcome. In many cases bleeding may be induced either by the administration of estrogenic substance alone or by the use of this substance followed by the corpus luteum factor (progestin). However, nearly always such bleeding will recur only as long as one or both of these substances are administered. If only estrogenic substance is given, the bleeding is due to a proliferative type of endometrium. If both estrogenic and corpus luteum substances are given in sequence the flow may be associated with a secretory endometrium, but pregnancy will not be possible unless an ovum is present. Even though this patient has amenorrhea she may be ovulating. This can be determined by a study of the uterine endometrium at weekly intervals. Pieces of endometrium may readily be obtained in the physician's office without anesthesia by using one of a number of curets specially devised for this purpose.

The only value in bringing about bleeding in amenorrheic women by means of endocrine principles is a psychic one. If such women can be convinced that they are as healthy as women who do menstruate, there will be little need to treat them for amenorrhea. If bleeding is desired, this patient should be given 50,000 international units of estrogenic substance (theelin, amniotin) intramuscularly on the first, fourth, seventh, tenth and thirteenth days of a course and 15 international units of progestin (proluton) intramuscularly on the seventeenth, eighteenth, nineteenth, twentieth and twenty-first days. If bleeding is to occur it will usually take place within ten days after the last injection of progestin.

Gonadotropic substance from the urine of pregnant women (antuitrin-S, folluteín, antophysin) may be administered in place of progestin, but it is doubtful whether the results obtained are equivalent. One of the latter preparations may be injected intramuscularly in doses of from 150 to 200 rat units daily for five injections. To produce successive bleedings, these courses of treatment will nearly always have to be repeated.

RECURRING EPISTAXIS

To the Editor:—A white man, aged 42, has for the past four months suffered from epistaxis from the right nostril, at monthly intervals, bleeding at each time about 500 cc. Rhinologists find during these attacks a spurting vessel on the septum, which when cauterized ceases bleeding almost immediately. The next month, however, the patient bleeds again from a different area on the septum but always on the right side. He states that when a child he had a tendency to frequent nose bleeds. He has a sister who also bleeds from her nose at some monthly intervals throughout the year, probably a trimester each year. He gives a history of chronic sinusitis (antrum) for the past ten years, with a history of sinus operations (drainage) of both sides some seven years ago. He also had gonorrhea about twenty years ago, with no recurrences. He is married and has no children. He is well developed and nourished. The blood pressure is 130 systolic, 80 diastolic, and during one of these bleeding periods it was 110/80. Both antrums are cloudy and there is a definite mucopurulent drainage from the sinuses. Nasopharyngoscopic examination does not reveal any ulceration of the nasal passages. The oral cavity, neck, heart, lungs, abdomen and genitalia are entirely normal. The prostate is enlarged 2 plus, and massage reveals about 75 pus cells per low power field, lymphocytes predominating, and no organisms. The laboratory report (two weeks after the second nosebleed) was: hemoglobin 75 per cent, red blood cells 4,250,000, reticulocyte count 0.3 per cent, white blood cells 8,000, polymorphonuclears 68 per cent, lymphocytes 27 per cent, myelocytes 1 per cent, eosinophils 4 per cent, nuclear index 6.4, sedimentation rate 1.6 cm. in one hour, blood phosphorus 2.6 mg., blood calcium 10 mg., blood Kahn and Kolmer reactions negative, stool examination negative for parasites, blood cholesterol 150 mg., blood urea nitrogen 18, blood sugar (fasting) 100 mg., urine normal, bleeding time one minute, prothrombin time five and one-half minutes, capillary fragility test essentially normal. Iron therapy was used and there were prostatic massage and diathermy to the prostate. Although my belief is that the cause lies entirely within the nasal cavity and is not a blood dyscrasia, I have suggested to the patient that theelin or some ovarian preparation should be tried, especially because of the monthly recurrences. What further diagnostic procedures would you suggest? What treatment? The patient does not pick or traumatize his nose in any way.

M.D., Florida.

ANSWER.—Since there is nothing in the history or examination of the blood to suggest a blood dyscrasia and since no lesions are visible in the nasal cavity proper, it is important next to exclude the possibility of a malignant growth in the chronically infected antrum. This sinus should be filled with some contrast medium and roentgenograms taken. Should these disclose disease involving either the mucous lining or the bony walls, the next step would be a Caldwell-Luc operation. If the roentgenograms prove negative, one must then be sure that there is no lesion in the nasopharynx. Carcinoma is not so infrequent in this location and may be responsible for recurring hemorrhages, although these as a rule are likely to come at irregular periods. In the absence of any of these possibilities, one is forced to treat the condition empirically. The best method is with radium. A 25 mg. capsule protected by rubber tubing is placed in each nasal chamber, held in place with packing and left there for three hours. This yields a total of 150 mg. hours for the two sides. A slight reaction in the form of redness and swelling may follow for two or three weeks and the application can be repeated within four to six weeks.

OCCUPATIONAL DISEASE IN PHOTOGRAPHER

To the Editor:—A professional photographer, aged 50, for the past four months has noted dizziness, weakness, loss of hearing in one ear and loss of smell, which has become progressively worse. He has lost 20 pounds (9 Kg.). The red blood cell count is 5,200,000; hemoglobin is 85 per cent; Wassermann reactions are negative; the reflexes are all normal. Can any chemical or chemicals with which the photographer comes in contact cause an intoxication to explain these symptoms? If so, what are the antidotes?

LEONARD J. RABHAN, M.D., Savannah, Ga.

ANSWER.—The photographic art is so highly individualistic that scarcely any two large establishments make use of precisely the same chemicals in their practices. Among the commonly used substances are methyl para-aminophenol sulfate, para-amidophenol hydrochloride, diamidophenol sulfate, potassium dichromate and quinone-chlorodiamine, together with many common acids, sodium thiosulfate, silver nitrate, borax, ferricyanides and potassium bromide. The majority of these substances are well known as causes of dermatitis and the photographic trade may be characterized as one in which dermatoses arise with great frequency. None of these substances are known to be capable of producing the systemic disturbances described in the query. If it may be assumed that this clinical condition is the result of work exposures, suspicion may be directed to the mounting cements. At the present time large numbers of photographers use rubber cement, which frequently contains benzene, for mounting prints. Working in a confined space, exposure to evaporated benzene, connected with the frequent mounting of batches of pictures, is sufficient to produce benzene poisoning. The clinical picture described is not entirely characteristic of benzene poisoning, but the "dizziness, weakness, loss

of weight and malaise" are all suggestive. The following steps should be undertaken in this connection:

(*a*) Investigation of the nature of mounting cements.

(*b*) The making of differential blood counts—a leukopenia being highly suggestive of benzene poisoning.

(*c*) The making of the urine sulfate test as described by Yant, Schrenk, Sayers, Horvath and Reinhart in the *Journal of Industrial Hygiene and Toxicology* **18**:69 (Jan.) 1937.

ENDEMIC GOITER IN PREGNANCY

To the Editor:—A white woman, aged 31, active, intelligent and in good health, recently married, desires to become pregnant. Born and educated in the Middle West, she has an endemic goiter; it is not large or disfiguring and does not produce symptoms. The fulness of the thyroid, however, is much more prominent during the menstrual period. The patient is 5 feet 4 inches tall (163 cm.) and weighs 128 pounds (58 Kg.). The pulse is 76 and the blood pressure 114 systolic, 60 diastolic. The patient's mother also had thyroid enlargement, which disappeared after pregnancy. In the event of pregnancy, should the patient receive any thyroid or iodine therapy? If so, what and how much? Is there any danger of the thyroid becoming larger or of a thyroid cretin offspring? Any information and advice as to the proper management of this patient before, during and after pregnancy will be greatly appreciated.

M.D., New Jersey.

ANSWER.—The diffuse enlargement of the thyroid, which is endemic in the Great Lakes region and is not productive of symptoms, is unlikely to give rise to pathologic changes during pregnancy. It would be advisable to have a determination of the basal metabolism. If this is normal, the patient can use iodized salt during her pregnancy unless salt is contraindicated because of a developing toxemia of pregnancy. Small doses of iodine in the form of compound solution of iodine, one drop daily, can be given in place of the iodized salt. It has been found that minute doses of iodine during pregnancy provide a sufficient safeguard against the development of undesirable symptoms. There is little likelihood of a cretin offspring in the patient described, and if the basal metabolism is within normal limits the small amounts of iodine will provide additional protection in this regard. The management following pregnancy need not differ from that during pregnancy. The basal metabolic test can be repeated three months post partum as an added precaution.

MARIHUANA, OR CANNABIS

To the Editor:—There is considerable interest in my community regarding the prevalence of the use of marihuana, or cannabis. I would appreciate it if you could supply me with some information concerning its general consumption, how it is prepared, and the rapidity with which its use is being increased in this country. Any additional information concerning its growth and preparation for "bootleg" consumption will be greatly appreciated.

A. B. BOWYER, M.D., Buckhannon, W. Va.

ANSWER.—Up to within the last decade, the use of marihuana was confined largely to the states bordering on Mexico and to communities farther north having a large Mexican immigrant population. Within the last few years its use has spread to nearly all parts of the United States, and especially the eastern half. It is a weed and is grown easily. Patches have been found under cultivation in many communities, both in small towns and in cities, and even in prison yards. Large quantities have been destroyed by federal agents. The leaves are merely dried and the drug is then ready for smoking. There have been conflicting reports as to the deleterious action of marihuana on the human system when smoked. The majority opinion is that it is habit forming and is responsible for its users running amuck.

Information relative to the growth, preparation for marketing, sources of supply and consumption of marihuana or cannabis can be obtained by consulting the following literature:

McCormack, George Randall: Marihuana, *Hygeia* **15**: 898 (Oct.) 1937.

Hearings before the Committee on Ways and Means, House of Representatives, Seventy-Fifth Congress, first session, April 27-30 and May 4, 1937, on H. R. 6385, "A Bill to impose an occupational excise tax upon certain dealers in marihuana, to impose a transfer tax upon certain dealings in marihuana, and to safeguard the revenue therefrom by registry and recording," United States Government Printing Office, Washington, D. C.

Anslinger, H. J.: Traffic in Opium and Other Dangerous Drugs for the Year Ended December 31, 1935, U. S. Treasury Department, Bureau of Narcotics, U. S. Government Printing Office, Washington, 1936, pages 30-34, 39-40 and 63.

The following articles relating to the federal regulation of marihuana or cannabis were published in THE JOURNAL during the year 1937:

Federal Regulation of Medicinal Use of Cannabis, Editorial, THE JOURNAL, May 1, 1937, p. 1543.

United States Assumes Control of Cannabis, *ibid.*, September 11, p. 31 B.

Federal Cannabis Regulations Approved, *ibid.*, October 16, p. 63B.

POSSIBLE CRIMINAL ABORTION

To the Editor:—A short time ago my colleague and I performed a necropsy on the body of a woman, aged 34, at the request of a coroner's jury, in an effort to determine the cause of death. It was done some twelve hours after death, and the body was in rather a foul condition. The following are the salient facts: The history of the case, scanty though it was, led one to believe that the cause of death would be found in the abdomen and this proved to be true. There was (1) a generalized peritonitis, (2) a large amount of hemorrhage in and around the pelvic organs and (3) a 1½ inch ragged hole in the fundus of the uterus. The uterus was slightly enlarged and boggy but contained no products of conception. Both tubes and ovaries were normal. On the basis of these observations we reported the cause of death as (1) hemorrhage, (2) peritonitis and (3) rupture of the uterus, probably the result of an attempt to do an abortion by instruments in the hands of some unknown person or persons. As stated, the clinical history and course of the case is meager. My colleague saw the patient once before death but was not able to obtain a clear and adequate history. It is stated, however, by some of those who attended the patient that she "miscarried" some time before death ensued. No one can say whether this was a blood clot or whether it really was a fetus passed. I realize that the information given here is wholly inadequate, but if you can help us with the following questions, we shall be deeply grateful. Do you think our diagnosis as to the cause of death reasonable? I might add here that the husband, whose character and reputation are reported as being questionable, is being held for the alleged crime. Could there be any other assignable cause for the hole found in the fundus of the uterus? If so, will you please give references so that I may read of the cases? A great deal has been said in the court where this case is now being tried over the probability of the patient herself having punctured the uterus in an attempt to do an abortion. Do you think this likely? Are there any cases of a similar nature reported in the literature? As you can see, the entire case is rather vague except for the fact that the uterus was found to be perforated at the fundus.

M.D.

ANSWER.—The conclusion that death resulted from rupture of the uterus, hemorrhage and peritonitis seems warranted by the results of the necropsy even though nothing is said about organs and parts other than the pelvis and the peritoneum. "A 1½ inch ragged hole in the fundus of the uterus," which was "slightly enlarged and boggy," certainly suggests perforation in the course of efforts to evacuate the pregnant uterus, but obviously other possibilities, however remote they may seem, cannot be excluded definitely in the absence of positive signs of pregnancy. It is noteworthy that the question does not tell whether the patient was a multipara or a possible primipara or whether the physician who saw her "once before death" made any pelvic or other examinations. And the account of the necropsy is silent as to the breasts, as to signs of infection in the uterus, as to a possible placental site, as to the condition of the uterine cervix—did it show marks of having been grasped by tenaculum or other means?—and as to the vagina and perineum. Abortion may be attempted on a nonpregnant woman who is assumed to be pregnant, and death has resulted from such attempts. Efforts at self-induced abortion are not uncommon and may include insertion into the vagina of darning needles, umbrella ribs or sounds, penetration into the abdominal cavity, usually through the vagina, and death may result. In cases possibly of this nature the question must be considered whether the injuries found could have been caused by the woman herself.

CLIMATE AND SCHOOLS FOR RHEUMATIC FEVER

To the Editor:—Please send me information regarding schools for children who are convalescing from rheumatic fever. What climate seems to be the most favorable? I am particularly interested in schools located in Florida.

GEORGE I. EDELSTEIN, M.D., Brooklyn.

ANSWER.—There are no schools established especially to care for children convalescing from rheumatic fever. In various large cities, particularly in the northern latitudes there are numerous institutions, usually convalescent homes, where the rheumatic fever subject receives schooling as a part of his institutional care. In some of these large cities it is possible to place the rheumatic child in special classes in public schools. In the state of Florida there is no school which specializes in convalescent rheumatic fever children. The Out-of-Door School of Sarasota, Fla., has come nearer to this than any other known school, having a supervising nurse who has had several years' experience in one of the good rheumatic fever clinics in the North.

It is impossible to state with any degree of certainty what climate would be most favorable. The geographic distribution of rheumatic fever is not well known. Of interest is the recent interesting study of Paul and Dixon (THE JOURNAL, June 19, 1937, p. 2096) and the report of Nichol (*J. Lab. & Clin. Med.* **21**:588 [March] 1936). Transportation of rheumatic fever subjects to a tropical or subtropical climate involves many difficult problems and is not to be entered on lightly. The successful

transporation of eleven patients to Puerto Rico by Dr. A. F. Coburn is related in his monograph "The Factor of Infection in the Rheumatic State," Baltimore, Williams & Wilkins Company, 1931. A short summary and discussion of the transporation of children to southern Florida appear in the proceedings of the American Rheumatism Association (THE JOURNAL, Oct. 16, 1937, p. 1307). From this report it is evident that such transportation is not a panacea. Southern Florida, Arizona and California have been about equally popular as a climate of choice, and any advantage of one over the other is unknown.

ROOT RESORPTION FOLLOWING ORTHODONTIC TREATMENT

To the Editor:—A man, aged 24, well proportioned, weighing 165 pounds (75 Kg.) and 5 feet 10 inches (178 cm.) in height, has been informed that he will lose his teeth in a few years. He has had orthodontic treatments for a period of four years under the care of an eminent and capable orthodontist. X-ray examination of the teeth prior to treatment revealed normal roots and excellent condition of all his teeth. Traumatic occlusion was present previously and is present now. Cosmetically, however, the result is good. The general physical and mental status of the young man is excellent. He eats a well balanced diet of fresh foods, vitamins and minerals. X-ray examination of his teeth after orthodontic treatment reveals absorption of the roots, which condition was not present four years ago when it was instituted. On this basis an eminent pharmacologist and physician prophesied that he would lose his teeth in a few years. Retainers on the teeth seem to be contraindicated. Apparently the traumatic occlusion, which is still present, indicates a bad prognosis. Your opinion is desired as to etiology and treatment.

CARL DAVIS, M.D., Bayside, L. I.

ANSWER.—A reasonably satisfactory answer to this question could be made only after an examination of the patient and a careful study of accurate casts of the mouth and roentgenograms. In their absence, however, some general statements can be made. First, traumatic occlusion is an indefinite and controversial concept. It cannot be determined by an analysis of mechanical conditions alone. It is a ratio or relation between mechanical conditions and the ability of the tissue to sustain them. It may be called a mechanical tolerance, somewhat comparable to the sugar tolerance of an individual. In the consideration of traumatic occlusion too often the mechanical conditions alone have been considered. To predict, therefore, what will happen to a denture simply by an analysis of the mechanical conditions is not wise.

Resorption of the roots of teeth has undoubtedly been produced by orthodontic movement, but no satisfactory correlation has ever been established between resorption and methods of treatment. From the observation of cases in which root resorption has occurred in orthodontic treatment it would seem justifiable to say that the resorption is usually not progressive after the completion of treatment and usually does not affect the functional efficiency of the denture.

The work of Dr. Herman Becks of the University of California has apparently established the relation between hypoparathyroidism and root resorption. He has shown that root resorption occurs in many hypoparathyroid patients who have had no orthodontic treatment or other mechanical stimulus.

To predict the loss of the patient's teeth in the near future on the basis of root resorption or traumatic occlusion does not seem justified.

REGIONAL ILEITIS

To the Editor:—A diagnosis of regional ileitis and ulcerative colitis of the ascending colon was made on a patient about five months ago. The condition is about two years old. Clinically the patient seems fairly well and has one or two well formed stools daily, no blood, little mucus, and no fever. His weight has remained rather stationary; his appetite is poor. Resection of the diseased ileum and colon has been advised, but he is averse to having that done because of his comparatively good condition. What would you advise? If resection is advised, what are the mortality rates and prognosis for cure.

M.D., New York.

ANSWER.—The subject of regional ileitis and regional ulcerative colitis has come to the fore in recent years. There exists an ulcerative ileocolitis in which isolated parts of the intestine are involved. Apparently, it may affect any segment of the small or large intestine. Occasionally, multiple segments have been involved. The condition has been found limited to small portions of the jejunum, ileum and large intestine. In some respects it simulates the so-called bacterial type of chronic ulcerative colitis known frequently as colitis gravis. No particular type of bacteria has been found frequently enough in these cases to give assurance regarding its etiology.

To date, the treatment of choice seems to be surgical resection. Its indication will depend on the extent and severity of involvement. It is best undertaken when the patient's condition is good, for the tendency of the condition is to progress so that larger and larger segments of bowel ultimately are involved. The end results of surgical excision are good. Recurrences after resection have occurred but they are relatively uncommon. In the main, it can be said that the ultimate prognosis for cure by complete eradication of the disease is good. It would be difficult to quote the mortality statistics because they vary considerably in the hands of different surgeons. In the main, the associated surgical risk has been comparatively low.

MERALGIA PARESTHAETICA

To the Editor:—A white man, aged 36, complains of numbness on the anterior surface of the left thigh. The onset occurred two years ago, when slight burning sensations were noted in the left thigh on long sitting or standing. The sensations were infrequent and transitory. Now the sensation is that of "dead weight" and is present almost continuously. Last month he sprained his back, and it was strapped. The strapping, done in the usual way, aggravated the sensations of numbness and had to be removed. Examination of the patient is negative except for the left thigh. The area involved is on the anterior surface, beginning 2½ inches below the groin and extending to the kneecap. It covers partly the distribution of the lateral femoral cutaneous nerve and partly that of the anterior femoral cutaneous nerve; in any case the spinal origin is lumbar 2, 3. Here there is diminished (not absent) sensitivity to light touch, pin prick, pressure, and hot and cold. The skin shows no atrophy. There is no motor disturbance. The reflexes are normal. The blood and the urine are normal. There is a history of chronic pyelitis, but there are no signs at present. X-ray examination of the lumbar vertebrae gave negative results. The left hip showed normal bony outlines and no rarefactions but some joint mice in the cavity. No other pathologic changes were noted. Since the patient has no complaints or physical abnormalities referable to the left hip, what importance do you attach to the joint mice in relation to the nerve symptoms? What would you suggest as to the possible cause of these symptoms and method of treatment?

M.D., New York.

ANSWER.—The condition is probably meralgia paraesthetica as described by V. K. Roth (*Med. Obozr* **43**:678, 1895) and Martin Bernhardt (*Neurol. Centralbl.* **14**:242,1895) independently. J. H. Musser and Joseph Sailer (*J. Nerv. & Ment. Dis.* **27**:16, 1900) collected reports of 100 cases in 1900, and H. I. Goldstein (*Am. J. M. Sc.* **162**:720 [Nov.] 1921) found 135 cases in the literature up to 1920. Osler gives a good account of the disease in his textbook. H. R. Viets (*Boston M. & S. J.* **191**:497 [Sept. 11] 1924) reported two cases. The disease is usually limited to the external cutaneous nerve, although the anterior crural nerve may be involved, as it often overlaps the other. About 75 per cent of the cases are in men and are due to trauma or pressure from orthopedic belts or strapping. Pregnancy is a common cause in women. Treatment consists of alcohol injection or excision of the nerve. The condition should be distinguished from the pain caused by spinal cord tumor or tabes dorsalis.

INGUINAL LYMPHADENITIS OR VENEREAL LYMPHOGRANULOMA

To the Editor:—A man, aged 34, for the past two months has had a chronic suppurative lymphadenitis of the left inguinal region. About March 25, 1937, he slipped on an icy pavement, experiencing a sharp pain in the left groin. The pain increased in severity during the next few days. March 31 I could discover nothing except a small, superficial lymph gland in the inguinal region, which was rather tender to touch. There was no visible skin injury in the neighboring thigh, rectum or genitals. There was no history of gonorrhea, the blood Kahn reaction was negative, and the Frei test was negative. After several days of treatment in bed, a soft mass finally formed, which I opened. A great deal of pus was removed, and the wound has been draining since. A smear showed only pus cells, with no bacteria. Can such a condition arise from trauma alone without the necessity of a lymphatic invasion by bacteria from a regional skin wound? Is it possible that a lymph gland may have been infected years ago, remained quiescent, and then flared up as a result of the trauma? I would appreciate any reference to the literature.

EDWARD J. STEINER, M.D., Chicago.

ANSWER.—One would be suspicious in this case of venereal lymphogranuloma despite a negative Frei test. It might be wise to give one ampule of Frei antigen (Lederle) intradermally once a week for five or six weeks to see whether or not improvement would take place. One cannot exclude trauma as a factor in the etiology of this abscess, although organisms must have been present in the lymph node or in the neighboring soft parts, skin or subjacent tissues.

References:

Weeks, Alanson; O'Reilly, B. C. N.; Delprat, G. D., and Stowe, W. P.: Subacute Lymphogranuloma Inguinale, *Arch. Surg.* **29**: 529 (Oct.) 1934.

Thomas, W. A., and McCarthy, E. R.: Treatment of Lymphogranuloma Inguinale with Bouillon Filtrate, THE JOURNAL, March 10, 1934, p. 766.

Tamura, J. T.: Cultivation of the Virus of Lymphogranuloma Inguinale and Its Use in Therapeutic Inoculation, THE JOURNAL, Aug. 11, 1934, p. 408.

Coutts, W. E.; Martini Herrera, J., and Landa Perroni, F.: Lymphogranulomatosis Venerea. *Am. J. Surg.* **21**: 96 (Oct.) 1933.

SENSITIVITY TO CASSAVA—JERUSALEM ARTICHOKE

To the Editor:—Can you give me some information on the following points: 1. Does sensitivity occur to tapioca; arrowroot? There seems to be a difference of opinion on this point. 2. Where can artichoke flour (made from the Jerusalem artichoke) be obtained? Does it have other substances mixed with it? 3. Of what is "cassava cake" (made by Arnaud, Incorporated, Detroit) made? These products would be of great help in planning diets for patients sensitive to all the common cereals, if adequate information about them can be obtained.

M.D., Illinois.

ANSWER.—1 and 3. "Cassava cake" is imported from South America (Arnaud, Incorporated, 24 West Statefair Road, Detroit). It is a wafer made of finely ground cassava, a minute quantity of salt, and water. Both arrowroot and tapioca are obtained from this same plant. Cassava is a farinaceous root of two plants of the spurge family, the bitter cassava and the sweet cassava. Both are natives of South America. Bitter cassava is more important commercially and has been introduced into most tropical countries. No report has been found in the literature regarding tapioca and arrowroot sensitivity, though there is apparently no reason why this might not occur. Cassava is of importance in planning the diet for allergic patients, as it is high in carbohydrates (69.5 per cent) and its caloric value (3.3 calories per gram) is likewise high.

2. Artichoke flour has been made by the Pabst Brewing Company for several years. The stock and methods for producing this are now in the hands of Anthony A. DeBole, American Artichoke Products, 178 Prince Street, New York. He states that he manufactures this at present for commercial experiments only and has only 5,000 pounds of it on hand.

LEADING CAUSES OF DEATH

To the Editor:—What are the ten most important causes of death in the United States?

F. EARLE MAGEE, M.D., Oil City, Pa.

ANSWER.—The mortality in 1933, according to Britten (*Pub. Health Rep.* **51**:1 [July 17] 1936), as based on the crude annual death rate per hundred thousand, is as follows:

Diseases of the heart	228.0
Cancer and other malignant tumors	102.2
Influenza and pneumonia	95.6
Nephritis and other kidney diseases	85.7
Cerebral hemorrhage	84.0
Tuberculosis	59.5
Diseases of early infancy	50.6
Automobile accidents	24.7
Diabetes mellitus	21.3
Diarrhea and enteritis	17.2

For the industrial policyholders of the Metropolitan Life Insurance Company for the year 1934 (Armstrong: Competitive Plagues of Mankind, *Better Health*, August 1935), the seven leading causes of death per hundred thousand were listed as:

Heart disease	162.7
Cancer	96.0
Pneumonia	65.0
Chronic nephritis	64.8
Cerebral hemorrhage	63.2
Tuberculosis	59.3
Accidents (all forms)	57.8

For further details on this subject the annual compilations of the Bureau of the Census, called "Mortality Statistics," should be consulted.

DILATION OF ANUS IN BABIES

To the Editor:—What are the indications for stretching the anus of young babies and the method employed?

M.D., Pa.

ANSWER.—Strictures of the rectum in young babies may necessitate stretching of the anus. Strictures of the lower part of the rectum or anus may be due to embryologic malformations of the rectum and anus. These include (1) narrowing of the anorectal region without complete occlusion, (2) complete occlusion of the anus by a single membranous diaphragm, (3) absence of the anus, with the rectum ending in a culdesac, and (4) a normal external anus ending in a culdesac, and the rectum ending at a varying distance above.

Strictures of the lower part of the rectum may be the result of inflammatory lesions, such as gonorrhea, or the scar tissue from a fistula in ano. Strictures may be due also to sacral tumors, such as dermoid cysts, or to intra-abdominal tumors, such as cysts of the kidneys. Accidental injury, with resulting scar tissue, may be cited as another cause, or stricture following the opening of an imperforate anus may result from scar tissue. Syphilis of the rectum is said occasionally to cause stricture. Hemorrhoids are rare in children and probably are never the cause of stricture.

In case of imperforate anus, the diagnosis must be made early and, if there is but a thin membrane, this may be easily cut or punctured and dilated to a sufficient degree to permit a free passage of meconium.

When the anus is absent, a more complicated surgical procedure is necessary. When there is stricture due to other causes, dilation may be attempted with the finger of the physician or rectal dilators may be resorted to. It must be remembered that the tissues of a young infant should always be treated with respect, and forcible dilation by any method should be avoided.

MOLDS OF INJURED FACES

To the Editor:—Where can I get material and instructions for making molds of injured faces?

A. L. DELANEY, M.D., Liberty, Texas.

ANSWER.—There are a number of ways of doing this. A fine grade of plaster of paris can be applied directly to the face to get a negative and then filled with either plaster of paris or gelatin. If one is not familiar with the use of plaster of paris, a dental surgeon would be helpful. Negocoll is one of the preparations used for this purpose; it is carried by dental supply houses. Dr. E. H. Golden, University Club Building, St. Louis, makes impressions by spraying wax on the face.

X-RAY AND SHORT WAVE THERAPY FOR NASAL POLYPS

To the Editor:—Can you give me any information regarding the use of the x-ray and short wave combination for nasal polyps? A patient has been advised to have such treatment. Does it offer a good hope?

LOUIS L. SHERMAN, M.D., Oakland, Calif.

ANSWER.—As far as short wave therapy is concerned, it can have no effect other than that which heat would produce, and there is nothing to indicate that heat is a particularly favorable therapeutic measure for nasal polyps. Some favorable results have been reported after radiation therapy. As only a small number of men have reported in the literature on the use of x-rays and radium, and, further, as by far the larger number of reputable men in the profession both here and abroad do not use x-rays or radium consistently or regularly for the treatment of polyps, it must be said that, while there can be no great objection to the use of radiation therapy, conservative and older measures are still the procedures of choice.

TREATMENT OF SEASICKNESS

To the Editor:—What is the most satisfactory treatment for seasickness, both prophylactic and active?

M.D., California.

ANSWER.—Not only is there no specific treatment for seasickness, but there is no generally applicable satisfactory treatment. For the average traveler, who under average conditions adjusts himself within a short time to life on shipboard, the best course to follow is usually to take no drugs and to remain quiescent as long as nausea persists, awaiting the generally favorable outcome. For the person whose previous experience leads him to expect severe and persistent symptoms, or for a short but stormy passage, a judicious use of sedatives, for both prophylaxis and treatment, is often recommended. The barbiturates, especially phenobarbital, taken together with belladonna, may prove beneficial. It must be emphasized, however, that indiscriminate use of sedatives may result in prolonging the indisposition even beyond the period of the voyage itself.

TITANIUM OXALATE IN ARTERIOSCLEROSIS

To the Editor:—Can you inform me whether titanium oxalate is of any value in arteriosclerotic disease? None of my books mention this substance. C. W. Kjelgaard in the April *Medical World* writes rather enthusiastically about it, but I wonder whether it is "just another drug."

F. H. GILE, M.D., Braintree, Mass.

ANSWER.—The *Quarterly Cumulative Index Medicus* gives no reference to the use of titanium oxalate in arteriosclerotic disease. Some work has been done in France on the titanium content of tissues, particularly of lung tissue in connection with pneumoconiosis. The work of Kjelgaard probably reports the first attempt to apply this rare element in therapy, and skepticism is justified until further data are available. Certainly the internal use of an oxalate salt is precarious.

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Medical Examinations and Licensure

COMING EXAMINATIONS

STATE AND TERRITORIAL BOARDS

ALABAMA: Montgomery, June 28. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ALASKA: Juneau, March 1. Sec., Dr. W. W. Council, Box 561, Juneau.

CALIFORNIA: *Reciprocity.* San Francisco, Jan. 5, Los Angeles, Feb. 23, San Francisco, May 11, Los Angeles, July 11, San Francisco, Sept. 14, and Los Angeles, Nov. 16. *Written examinations.* Los Angeles, March 7-10, San Francisco, June 27-30, Los Angeles, July 11-14, and Sacramento, Oct. 17-20. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Basic Science.* New Haven, Feb. 12. *Prerequisite to license examination.* Address State Board of Healing Arts, 1895 Yale Station, New Haven. *Medical (Regular).* Hartford, March 8-9. *Endorsement.* Hartford, March 22. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. *Medical (Homeopathic).* Derby, March 8. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: Dover, July 12-14. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: Washington, Jan. 10-11. Sec., Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: Jacksonville, June 13-14. Sec., Dr. William M. Rowlett, Box 780, Tampa.

GEORGIA: Atlanta, June. Joint Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.

IDAHO: Boise, April 5-6. Commissioner of Law Enforcement, Hon. J. L. Balderston, 205 State Capitol Bldg., Boise.

ILLINOIS: Chicago, Jan. 25-27, April 5-7, June 28-July 1, and Oct. 18-20. Superintendent of Registration, Department of Registration and Education, Mr. Homer J. Byrd, Springfield.

INDIANA: Indianapolis, June 21-23. Sec., Board of Medical Registration and Examination, Dr. J. W. Bowers, 301 State House, Indianapolis.

IOWA: *Basic Science:* Des Moines, Jan. 11. Sec., Dr. W. L. Strunk, Decorah.

MAINE: Portland, March 8-9. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State Street, Portland.

MASSACHUSETTS: Boston, March 8-10. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MICHIGAN: Ann Arbor and Detroit, June 15-17. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 202-3-4 Hollister Bldg., Lansing.

MINNESOTA: Minneapolis, Jan. 18-20. Sec., Dr. Julian F. Du Bois, 350 St. Peter St., St. Paul.

MONTANA: Helena, April 5-6. Sec., Dr. S. A. Cooney, 205 Power Block, Helena.

NEBRASKA: *Basic Science.* Omaha, Jan. 11-12. Dir., Bureau of Examining Boards, Mrs. Clark Perkins, State House, Lincoln.

NEVADA: *Reciprocity.* Carson City, Feb. 7. Sec., Dr. John E. Worden, Capitol Bldg., Carson City.

NEW HAMPSHIRE: Concord, March 10-11. Sec., Board of Registration in Medicine, Dr. Fred E. Clow, State House, Concord.

NEW JERSEY: Trenton, June 21-22. Sec., Dr. James J. McGuire, 28 W. State St., Trenton.

NEW MEXICO: Santa Fe, April 11-12. Sec., Dr. Le Grand Ward, 135 Sena Plaza, Santa Fe.

NEW YORK: Albany, Buffalo, New York, and Syracuse, Jan. 24-27, June 27-30, and Sept. 19-22. Chief, Professional Examinations Bureau, Mr. Herbert J. Hamilton, 315 Education Bldg., Albany.

OREGON: *Basic Science.* Portland, March 19. Sec., State Board of Higher Education, Mr. Charles D. Byrne, University of Oregon, Eugene.

PUERTO RICO: Santurce, March 1. Sec., Dr. O. Costa Mandry, Box 536, San Juan.

SOUTH DAKOTA: Pierre, Jan. 18-19. Director of Medical Licensure, Dr. B. A. Dyar, Pierre.

VERMONT: Burlington, Feb. 8. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

WEST VIRGINIA: Huntington, March 21-23. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WISCONSIN: Madison, Jan. 11-14. Sec., Dr. Henry J. Gramling, 2203 S. Layton Blvd., Milwaukee.

WYOMING: Cheyenne, Feb. 7. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

NATIONAL BOARD OF MEDICAL EXAMINERS SPECIAL BOARDS

Examinations of the *National Board of Medical Examiners* and *Special Boards* were published in THE JOURNAL, January 1, page 68.

Idaho October Report

Hon. J. L. Balderston, Commissioner of Law Enforcement, reports the written examination held by the Idaho State Board of Medical Examiners at Boise, Oct. 5-6, 1937. The examination covered 23 subjects and included 160 questions. An average of 75 per cent was required to pass. Fourteen candidates were examined, all of whom passed. Nineteen physicians were licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of California Medical School		(1937)	83
George Washington University School of Medicine		(1937)	77
Northwestern University Medical School		(1937)	87
Rush Medical College		(1935) 85, (1936) 84, (1937)	82, 85
School of Med. of the Division of the Biological Sciences		(1937)	83
University of Illinois College of Medicine		(1937)	84
Louisiana State University Medical Center		(1937)	87
University of Rochester School of Medicine		(1934)	82
University of Oregon Medical School		(1936)	82, 84
McGill University Faculty of Medicine		(1936)	86

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Northwestern University Medical School		(1934)	Hawaii
Rush Medical College		(1936)	California
Indiana University School of Medicine		(1927)	Indiana
State University of Iowa College of Medicine		(1931), (1935)	Iowa
University of Kansas School of Medicine		(1929), (1933)	Kansas
Louisiana State University Medical Center		(1936)	Louisiana
Washington University School of Medicine		(1931) (1934) Montana, (1934), (1935) Missouri	Utah,
Creighton University School of Medicine		(1924)	Mass.
University of Nebraska College of Medicine		(1903) (1925) Montana	Nebraska,
Syracuse University College of Medicine		(1930)	California
University of Cincinnati College of Medicine		(1931)	Ohio
University of Oregon Medical School		(1928) Montana, (1936)	Oregon

Georgia October Examination

Mr. R. C. Coleman, joint secretary, reports the written examination held by the Georgia State Board of Medical Examiners at Atlanta, Oct. 12-13, 1937. The examination covered 10 subjects and included 100 questions. An average of 80 per cent was required to pass. Two candidates were examined, both of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Northwestern University Medical School		(1928)	87.7
Cornell University Medical College		(1934)	85.4

Seven physicians were licensed by reciprocity and one physician was licensed by endorsement from August 3 through November 2. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Emory University School of Medicine		(1932) (1934) North Carolina	Mississippi,
Woman's Medical College of Pennsylvania		(1928)	Penna.
Medical College of the State of South Carolina		(1927)	South Carolina
Medical College of Virginia		(1914), (1929)	Virginia
University of Virginia Department of Medicine		(1909)	W. Virginia

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
University of Oregon Medical School		(1933)	N. B. M. Ex.

Arizona October Report

Dr. J. H. Patterson, secretary, Arizona State Board of Medical Examiners, reports the written examination held at Phoenix, Oct. 5-6, 1937. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass. Four candidates were examined, three of whom passed and one failed. Six physicians were licensed by endorsement.

School	PASSED	Year Grad.	Per Cent
Chicago Medical School		(1937)	90.2
Rush Medical College		(1935)	80.5
Creighton University School of Medicine		(1935)	82.6

School	FAILED	Year Grad.	Per Cent
Creighton University School of Medicine		(1936)	68.1

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
College of Medical Evangelists		(1937.2)	N. B. M. Ex.
University of Cincinnati College of Medicine		(1936)	Ohio
Jefferson Medical College of Philadelphia		(1928)	Penna.
University of Pennsylvania School of Medicine		(1927)	Penna.
McGill University Faculty of Medicine		(1926)	Canada

Tennessee September Examination

Dr. H. W. Qualls, secretary, Tennessee State Board of Medical Examiners, reports the written examination held at Memphis, Sept. 29-30, 1937. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass. Twenty-four candidates were examined, all of whom passed. The following school was represented:

School	PASSED	Year Grad.	Per Cent
University of Tennessee College of Medicine		(1937)	80.8, 82.6, 82.9, 82.9, 83, 83.5, 84.4, 84.4, 84.6, 84.8, 85, 85.1, 85.2, 85.2, 86.2, 86.3, 86.3, 86.4, 86.4, 86.4, 86.5, 86.5, 86.6

Book Notices

A Laboratory Handbook for Dietetics. By Mary Swartz Rose, Ph.D., Professor of Nutrition, Teachers College, Columbia University. Fourth edition. Cloth. Price, $3. Pp. 322. New York: Macmillan Company, 1937.

For many years this has been a standard textbook for college laboratory classes in dietetics and an invaluable source of reference material for all those concerned with practical problems in dietetics. In the eight years since the publication of the third edition, much new information has accumulated concerning the mineral and vitamin content of foods. In consequence, the tables giving mineral elements and vitamins have not only been completely recalculated but almost doubled in size. The average vitamin values are reported in terms of Sherman units. These values have been selected after careful consideration of the published analyses, which necessarily vary widely for the same kind of food, owing to differences in variety, maturity, climate and soil. They are intended primarily to give a basis for comparison of the relative vitamin potency of various foods. The tables of vitamin values are particularly useful, because figures for cooked foods have been included wherever these are available. In addition to the numerous conveniently arranged reference tables the handbook contains a brief discussion of the composition of food materials, functions of foods, and the food requirements of normal adults and children. Standard vitamin allowances estimated in terms of Sherman units per hundred calories have been proposed. In the light of the most recent studies available the vitamin A and G allowances appear to be generous, although higher standards for vitamin B_1 and C intakes might be considered desirable. This book deserves a place in the library of all physicians.

Some Quantitative Aspects of the Biological Action of X and γ Rays. By C. M. Scott. Medical Research Council. Special Report Series, No. 223. Paper. Price, 1s. 6d. Pp. 99, with 21 illustrations. London: His Majesty's Stationery Office. 1937.

The monograph is in pamphlet form and is divided into two parts. In the first part the author briefly sets forth and analyzes the experimental evidence bearing on the mechanism involved in the action of roentgen rays and the gamma rays of radium on living tissue. The second part is devoted to a report of experiments carried out by the author to elucidate certain phases of the action of roentgen rays and radium on tissues. He selected the muscular tissue of the heart as an example of a tissue that is known to be resistant to irradiation, and in contrast the eggs of the bluebottle fly, which are distinctly sensitive to irradiation. These experiments were designed to elucidate the effect of varying the intensity of irradiation as affected by temperature, by injury and by irradiation, separately or combined, the effect on radiosensitiveness of injury produced by asphyxia or by roentgen rays, or both, and the effect on radiosensitiveness of anesthesia such as chloroform, nitrous oxide, ether and certain fat solvents such as petroleum ether, by themselves or in combination with roentgen irradiation. The first part, in which the author discusses and analyzes the evidence bearing on the action of roentgen rays and the gamma rays of radium on living tissue, is a model of concise and clear writing and of sound thinking. This monograph should be read by every one who wishes to know and to understand as much as possible about the action of roentgen rays and gamma rays of radium on living cells as far as this is now known.

Memoranda of Toxicology. By Max Trumper, B.S., A.M., Ph.D., Consulting Clinical Chemist and Toxicologist. Third edition. Fabrikoid. Price, $2. Pp. 304. Philadelphia: P. Blakiston's Son & Co., Inc., 1937.

One of the neglected branches in the teaching of medicine is toxicology, mainly because a complete fundamental understanding of all basic sciences must be comprehended by the student before he can fully understand the close relationship between the diagnosis and treatment of poisoning. With the introduction of many new drugs and health-injurious solvents in industry, accurate knowledge must be provided to the beginning practitioner to diagnose and treat the toxic effects. The pocket size of this volume makes it an indispensable tool for emergency calls. Though Trumper does not deviate from the general outline of toxicologic textbooks dealing with corrosives, simple and specific irritants and neurotic poisons, his hundred page appendix on reptile venoms, insect bites, insulin, thallium, dinitrophenol and zinc stearate poisoning gives information otherwise available with difficulty. The addenda on alcoholism, lipoid solvents and first aid and the emphasis on gas mask service make this little book a real contribution to practical medicine. For the older physician the treatment on hydrogen ion concentration—the bugbear of many medical minds—is presented in a simple and understandable manner.

Story of Nevada State Medical Society and Nevada Medicine. By M. K. Walker, M.D. Paper. Price, 75 cents. Pp. 45. Reno, Nevada: The Author, [n. d.].

This pamphlet was prepared by one who has practiced medicine in Nevada for many years, having gone to Reno in 1900 before that city was incorporated. While the earliest records of the activities of Nevada physicians have been lost, they concerned for the most part the few doctors who passed through previous to 1850 on their way to the California gold fields. Only seven physicians attended the first meeting, called in 1872 at Pioche. When the Nevada State Medical Society was organized at Virginia City in 1875, it was not feasible to hold yearly meetings because of the small number of physicians. This organization at a meeting in 1894 at Reno elected Dr. Henry Bergsteine as delegate to the annual session of the American Medical Association in San Francisco that year. In 1904 a meeting was called to reactivate the state society. This group declared the old society defunct and formed a new organization with twenty-one charter members. The first annual meeting of the new society was held in May 1905 in Reno. The author gives brief accounts of many annual meetings of the state medical society, some of which were held in the offices of members in Reno, others at the Elks Hall in Goldfield or at Lake Tahoe. When the San Francisco earthquake and fire occurred in 1906, many of its members volunteered to go to San Francisco to help in that disaster. Among the changes that have occurred in Nevada medicine in the last thirty-seven years, the author points out the appearance of tularemia and "tick fever" as new diseases in that community. The condition that amazes him, however, is the increasing prevalence of nervous disorders. The first general hospital in Nevada apparently was St. Mary's in Virginia City, built in 1875. Nevada became a state in 1864, Reno was founded about 1868, and the State Hospital for Mental Diseases was built in 1881. There are twenty hospitals in the state now. The author reviews industrial medicine and surgery as practiced in the construction of Boulder Dam from 1931 to 1936. In view of the outbreak in Chicago in 1933 of amebic dysentery, the Boulder Dam officials would hire no food handlers who had been employed in the previous six months anywhere in northern Illinois. No cases of amebic dysentery developed in the Boulder Dam camp. The Boulder Dam studies of heat prostration showed that the cause of much heat prostration was the loss of salts, especially sodium chloride, in the excessive perspiration.

Personal Hygiene. By C. E. Turner, M.A., Dr.P.H., Professor of Biology and Public Health in the Massachusetts Institute of Technology. Cloth. Price, $2.25. Pp. 335, with 87 illustrations. St. Louis: C. V. Mosby Company, 1937.

This book, intended for instruction in health at the university level, is the outgrowth of the same author's previous volume, Personal and Community Health, but contains additional material. Beginning with a chapter on student attitude, in which appears the author's widely quoted definition of health and in which he expresses a sensible philosophy toward health, which avoids both negligence and hypochondriasis, he discusses in successive chapters nutrition, digestion, oral hygiene, respiration, circulation, excretion of nitrogenous waste, skin, endocrines, sense organs, nervous system, mental hygiene, bodily activity, body mechanics, food hygiene, reproduction, heredity, narcotics and stimulants, responsibility for health maintenance, communicable diseases and immunity and, in an appendix, the individual communicable diseases. The book is liberally and intelligently illustrated. There is a good glossary and an ade-

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quate index. The book teaches hygiene on the basis of physiology, giving enough and not too much information for the groups for which the book is intended, to serve as an adequate background for the health practices which he recommends. The latter are sensible and practical, especially with relation to touchy subjects such as alcohol, tobacco, tea, coffee and sex hygiene. The author, though not a physician, has a clear conception of individual responsibility for health and the physician-patient relationship. The volume, though intended for a textbook, would be an excellent reference book for the library of any family in which a sensible interest in health exists.

Die Vitamine und ihre klinische Anwendung: Ein kurzer Leitfaden. Von Prof. Dr. W. Stepp, Direktor der I. Medizin. Universitätsklinik München, Doz. Dr. J. Kühnau, Direktor des Städt. Forschungsinstituts für Bäderkunde und Stoffwechsel Wiesbaden, und Dr. phil. et med. habil. H. Schroeder, Ass.-Arzt an der I. Medizin. Universitätsklinik München. Second edition. Cloth. Pp. 189. Stuttgart: Ferdinand Enke, 1937.

An enlarged edition of this German monograph makes its appearance a little more than a year after the first. The authors again have succeeded in putting in brief form an extraordinary amount of information on the vitamins. The newer material includes a more detailed discussion of the functions of vitamin A with particular reference to its possible therapeutic uses, a discussion of the "filtrate factor" of the vitamin B complex, a brief account of vitamin K and a paragraph with references on the recent work on vitamin P. The monograph will prove most useful as a source of suggestions regarding further clinical studies, particularly on the vitamins available in crystalline form.

This book, in conjunction with other articles on the vitamins, emphasizes the need for a suitable international system of biochemical nomenclature. Early in 1937 Szent-Györgyi reported the presence of a substance, associated with vitamin C in nature, which was concerned with the maintenance of normal permeability of small blood vessels. This factor was identified as citrin, but the name vitamin P has also been bestowed on it, the letter P referring to the supposed relationship of this factor to the permeability of the capillaries. A vitamin L is concerned with lactation in experimental animals. A factor T, seemingly identical with vitamin K, is concerned with the maintenance of a normal "thrombozytenzahl" in hens. Vitamin H, as the term is used by the present authors, is the "haute faktor" of György, but the book makes no mention of the two other substances, which are described in the American literature as vitamin or factor H. The name which the authors of this monograph use for vitamin B_1 is "aneurin," whereas most American workers probably would use the name "thiamin chloride." Commercial preparations of this crystalline substance, vitamin B_1, have been introduced under such names as Betabion, Betaxin and Betanerva; the multiplicity of names adds to the confusion.

This book will be most useful to persons who already have a considerable knowledge of the vitamins. It will serve as a summary of recent contributions to the subject, particularly those of a clinical nature. The chief advantage of the book is its brevity, and therein also lies its deficiency. The tendency of the authors to catalogue everything may tend to give the unwary reader the false idea that the whole subject of the vitamins is definitely settled.

The Science of Seeing. By Matthew Luckiesh, D.Sc., D.E., Director, Lighting Research Laboratory, General Electric Company, Nela Park, Cleveland, and Frank K. Moss, E.E., Physicist, Lighting Research Laboratory. Cloth. Price, $6. Pp. 548, with 143 illustrations. New York: D. Van Nostrand Company, Incorporated, 1937.

The ambitious caption of this latest publication by Luckiesh and Moss would suggest that this treatise is an effort to coordinate the kaleidoscopic knowledge bearing on light and vision. However, as in the previous works of these authors, the book deals essentially with lighting for seeing, which would have been a more appropriate and less misleading title. These investigators, from the Lighting Research Laboratory of the General Electric Company, have been stressing for more than twenty years the importance of more and more light. That this evangelism has not been in vain is evidenced by the increasingly better lighting of stores, offices, factories and homes. Inadequate light admittedly causes eyestrain, fatigue and decreased visual efficiency, but the authors would attribute to this cause also the defective vision of intellectual workers and even to some degree the increase in defective vision occurring with age. To them "it is conceivable that the reflex effects of critical seeing and the prevalence of mortality cases from heart trouble in occupations demanding critical seeing may be related." The major problems of lighting practice—quantity, distribution and spectral quality—are interestingly discussed with the authority derived from personal research. Illumination above mere visual requirements increases visual efficiency —"production foot-candles"; further increments add to the ease of seeing, thus reducing nervous tension and promoting human welfare—"humanitarian foot-candles." Industrial production could be increased 10 per cent by increasing the present average of less than 5 to 25 foot-candles. There is no magic in colored papers or in colored glasses. On the rifle range, yellow-green glasses reduce the veiling blue haze of distance. At night on the highway, however, colored glasses by diminishing visibility become a hazard. Glasses are sold for protection from ultraviolet energy when there is no energy of this sort ordinarily present in sufficient amounts to be harmful. For the lay reader much practical information of this type is popularly presented, while the interest of the technically indoctrinated will be stimulated by the many novel instruments and experiments described.

The Physiology of Domestic Animals. By H. H. Dukes, D.V.M., M.S., Professor of Veterinary Physiology, New York State Veterinary College, Cornell University. With a chapter on the Physico-Chemical Basis of Physiological Phenomena. By E. A. Hewitt, D.V.M., Ph.D., Associate Professor of Veterinary Physiology, Division of Veterinary Medicine, Iowa State College. A Part on Reproduction. By G. W. McNutt, D.V.M., as revised by S. A. Asdell, M.A., Ph.D., Professor of Animal Physiology, New York State College of Agriculture, Cornell University. And a foreword by H. D. Bergman, D.V.M., Professor of Veterinary Physiology and Pharmacology, Division of Veterinary Medicine, Iowa State College. Fourth edition. Cloth. Price, $6. Pp. 695, with 167 illustrations. Ithaca, New York: Comstock Publishing Company, Inc., 1937.

This was written primarily for students in veterinary medicine, but little of the original material is derived from veterinary sources. The references accompanying each section duplicate closely those found in textbooks of advanced physiology for medical students. Furthermore, the comparative physiology of domestic animals has scarcely received the attention that might be expected from the veterinary group. Examination of the text shows a surprising dearth of discussion from a comparative point of view. Only occasionally are there references to differences in physiologic behavior in different species, the most complete presentation being in the sections on nutrition and metabolism and on reproduction. The textual material is conventionally sound, clearly presented and well arranged and is sufficiently advanced to be useful to medical students as a reference work.

Diseases of the Blood and Atlas of Hematology With Clinical and Hematologic Descriptions of the Blood Diseases Including a Section on Technic and Terminology. By Roy R. Kracke, M.D., Professor of Bacteriology, Pathology and Laboratory Diagnosis, Emory University School of Medicine, Atlanta, Georgia, and Hortense Elton Garver, M.D., Instructor in Laboratory Diagnosis, Emory University School of Medicine. Cloth. Price, $15. Pp. 532, with 61 illustrations. Philadelphia, London & Montreal: J. B. Lippincott Company, 1937.

This book is an answer to what the authors feel is a need for an American atlas of hematology to include both the clinical and the laboratory aspect of diseases of the blood. The preface states that the drawings have been made from preparations stained with Wright's stain, although there are some employing the supravital and peroxidase stains. The normal blood picture of laboratory animals, which, as the authors state, is difficult to find in medical literature, is given a chapter and should be welcomed by many investigators. The text begins with a discussion of hematologic terminology, involving an analysis of the origins and current usage of many of the terms. The discussion, which is badly needed by students and practitioners, is clear. The second chapter contains a long list of definitions of hematologic terms. The illustrations are good, and the publishers as well as the authors deserve congratulations for the accurate reproduction of colors. The section on hematologic technic has omitted much cumbersome material and discusses, on the whole, merely the more important meth-

ods. The inclusion of the Tallqvist hemoglobin scale and of only one method of determining sedimentation rate might be questioned, but, on the whole, this chapter is thoroughly adequate. The book will doubtless find a place on the shelves of laboratory technicians, medical students, pathologists, and those practicing physicians who wish to add a reasonable knowledge of blood morphology to their other diagnostic armamentarium.

Research Memorandum on Recreation in the Depression. By Jesse F. Steiner, Professor of Sociology, University of Washington. Prepared under the direction of the Committee on Studies in Social Aspects of the Depression. Bulletin 32. Paper. Price, $1. Pp. 124. New York: Social Science Research Council, 1937.

The seven parts of this monograph deal with recreational research, its problems, trends and source; with the recent expansion of leisure; with the changing tide of recreation; with recreation facilities under governmental auspices; with community organization for leisure; with recreation as a business enterprise, and, finally, with the future of recreation. The principal conclusion at which the study arrives is that factual information about recreation is inadequate and unreliable. The committee believes that leisure time, while increased during the depression, has not been increased uniformly for the whole people and that there has been, in fact, some decrease in leisure time. There has been as a result of the depression considerable decrease in recreational facilities in spite of the fact that certain relief projects have been in the field of recreation. Commercial recreation has fared surprisingly well during the depression in comparison with other forms of business. Typical of the problems raised by the report is the following paragraph:

> Questions need to be raised also concerning our popular appraisal of the quality of leisure time activities. Are our widely accepted notions of what is wholesome or unwholesome in recreation scientifically sound or are they emotional judgments growing out of the mores of our times? How can values be measured in the field of recreation? Are recent changes in recreational fashions and attitudes in the interests of human welfare? What kinds of evidence can be produced that will enable us to evaluate present recreational trends?

The monograph seems to be strictly what its title indicates; namely, a memorandum indicating probable lines along which research should be carried out with respect to recreation. It should be in reference libraries for the information of persons interested in community welfare and especially in recreation activities.

Latent Syphilis and the Autonomic Nervous System. By Griffith Evans, M.A., D.M., F.R.C.S. Second edition. Cloth. Price, $3. Pp. 158, with 50 illustrations. Baltimore: William Wood & Company, 1937.

The author discusses the place of syphilis in the etiology of diseases of the thyroid gland, asthma, angioneurotic edema, purpura, blanching and congestion of the extremities, claudication, abdominal adhesions, nervous dysphagia and pes cavus in a most unconvincing manner. It would seem that the author is unduly and unjustifiably impressed with the part that syphilis plays in the cause of certain clinical entities. Obviously the book is not recommended.

Alergiya. Zbirnik prats konferentsiï po alergiï, sklikanoï v m. Kievi z 1 po 4 lyutogo 1936 p. Institutom klinichnoï fiziologiï an URSR i Institutom Eksperimentalnoï Biologiï i Patologiï NKOZ URSR. Direktor Institutiv—O. O. Bogomolets. Allergie. Travaux de la conférence tenue à Kiev le 1-4 Février 1936 et organisée par l'Institut de physiologie clinique de l'Académie des sciences de la RSS d'Ukraine et l'Institut de biologie et pathologie expérimentales du commissariat du peuple de la santé publique de la RSS d'Ukraine. Directeur A. Bogomolets, membre de l'Académie. Paper. Price, 15 krb. Pp. 520, with illustrations. Kiev: l'Académie des Sciences de la RSS d'Ukraine, 1937.

This is a collection of papers read before the Conference on Allergy organized by the Ukrainian Academy of Sciences and the Institute of Experimental Biology and Pathology, Feb. 1-4, 1936. The various aspects of the subject were discussed under the headings of the mechanism of typical allergic processes, the role of the nervous system in the development of allergy, the role of allergy in the pathogenesis of the infectious diseases (tuberculosis, rheumatism, endocarditis and so on), pathologic morphology of allergic processes, hetero-allergy, and the role of external factors in allergic manifestations. In summarizing the results of the conference, O. O. Bogomolets expressed the opinion that the number of purely allergic diseases will be considerably reduced. At the same time allergy is to be regarded as a component of a number of disease states, particularly those of infectious character. The question of whether allergy is a beneficent or an injurious factor depends on whether one regards it as a dynamic state which precedes the state of immunity and is necessary for its development. When allergy does not pass on to immunity it becomes an injurious factor, creating a therapeutic problem of its removal through desensitization. Sensitization, both specific and nonspecific, constitutes the obligatory sign of allergy. Among the interesting points established by the conference, Bogomolets points out the establishment of irrefutable evidence of the cellular nature of allergic reactions. Anaphylaxis appears as the more specific allergic manifestation. The role of precipitins in absorption shock is still obscure. The papers reflect a keen interest in the subject of allergy on the part of Russian clinicians and extensive experimental work directed toward the solution of the many problems the subject presents. Each paper is written in the Ukrainian or Russian and accompanied by either French or English translations.

Der Schiffs- und Hafenarzt: Ein Leitfaden für Ärzte und Seeleute. Herausgegeben von Dr. Friedrich Kortenhaus. Unter Mitarbeit von Dr. med. Heinz Spranger, Dr. med. Eduard Wolf, Dr. med. Friedrich Kortenhaus und Dr. med. Friedrich Hoder. Mit einem Geleitwort von Prof. Dr. Reiter, Präsident des Reichsgesundheitsamtes. Paper. Price, 6.50 marks. Pp. 185. Jena: Gustav Fischer, 1937.

This is a German manual for the ship's physician and the medical officer of ports, including both seaports and other ports of entry into the nation. It deals with international health conventions with special reference to the needs of German ship and port physicians. It sets forth in detail the regulations governing German physicians in the German merchant marine and the control of communicable diseases in ports and on ships, including the use of the radio communication at sea except the SOS. The manual will be of little use to American physicians in general, except as they may find it of general interest. To officials dealing with international quarantine and health and medical service at sea, it is a valuable supplementary volume.

General Hygiene and Preventive Medicine: A Text-Book for College Students, Medical Students, Nurses, Public Health Workers and Social Workers. By John Weinzirl, M.S., Ph.D., Dr. P.H. Edited by Adolph Weinzirl, B.S., M.D., C.P.H., Health Officer, Portland, Oregon. Cloth. Price, $4. Pp. 424. Philadelphia: Lea & Febiger, 1937.

This volume is intended primarily for college students in the upper divisions, medical students, nurses and teachers in training. The subject, the author states in the preface, is approached from an essentially new point of view: that of the methods employed to control disease, all other matter being held subordinate to that end. The book, however, barely escapes being a catalogue. For example, there are only slightly over two pages on the subject of pneumonia and almost exactly the same space for eye strain. An interesting deviation from the conventional presentation is the inclusion of eugenic measures in preventive medicine, under which head moronism, epilepsy and migraine are discussed. This book would be suitable for college students, teachers and the general public but would be totally inadequate for medical students or perhaps even nurses, all of whom should have a much wider knowledge of hygiene and preventive medicine. For the first mentioned groups, however, the clarity and brevity of presentation is highly desirable.

The Machinery of the Body. By Anton J. Carlson and Victor Johnson. Cloth. Price, $4. Pp. 580, with 187 illustrations. Chicago: University of Chicago Press, 1937.

As stated in the preface, this book is based on the presentation of physiology to college students and as such reflects much of the fundamental point of view underlying the attempt at correlation of knowledge as introduced into the curriculum at the University of Chicago. The text is interestingly and concisely written, simplified yet accurate. The subject matter embraces a wide range—biologic philosophy, physical chemistry, biology, general physiology, physiologic anatomy, human physiology and physiologic hygiene. The authors have succeeded more completely than any others with whom the reviewer is

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acquainted in bringing together in close integration all the physiologic relationships of the human race. The illustrations are well chosen and apparently mostly original, and the tables are original in arrangement. The indexing is complete and there is a list of supplementary reference monographs and textbooks. A bibliography of original sources is not included, probably because it would be too voluminous if one may judge from the extent, range and detail of subject matter.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Optometry Practice Acts: Acceptance of Employment by Resident Optometrist from Nonresident Optical Company Prohibited.—One Soland filed a complaint in the superior court of Marion County, Ind., against the Indiana State Board of Registration and Examination in Optometry, its individual members and the attorney general of the state, seeking a declaratory judgment and an injunction to prevent the enforcement of certain sections of the Indiana optometry practice act. While that complaint was pending, one Bennett, a licensed optometrist, filed an intervening petition, after the filing of which the original complaint by Soland was dismissed. Another optometrist also filed an intervening petition asserting the validity of the act and praying that the board be mandated to enforce it. The trial court upheld the validity of the act and mandated its enforcement. Bennett then appealed to the Supreme Court of Indiana.

Bennett contended that a section in the act prohibiting him from accepting employment from any person other than one who resides within the state and who holds a valid, unrevoked certificate of registration as an optometrist was unconstitutional in that it deprived him of a property right guaranteed by the Constitution. He contended that even if his employer is a nonresident and not licensed in Indiana, nevertheless he, as a regularly and duly licensed optometrist, cannot be deprived of the right to follow his profession within the state and that the fact that his employer is a nonresident bears no relation to the protection of the public health or the general welfare and safety of the citizens of the state. The relation of an optometrist to his patient, said the Supreme Court, is much the same as that of a physician and patient. The practice of optometry, as the practice of medicine, directly affects public health and is a proper subject for legislative regulation and control. The relationship with the patient is personal. Notwithstanding this relationship, the court continued, the appellant, Bennett, takes the position that the fact that the practitioner, duly licensed by the state, is employed by an unlicensed employer can bear no relation to public health. The relationship between the licensed optometrist and his unlicensed employer is that of master and servant. The master is in a position wherein he may dictate to his servant the manner of conducting his business, and the kind and nature of the goods to be sold and furnished to the patient, in order to procure the most favorable financial gain to the employer. And this may be done without regard to the public health, since the employer is a nonresident and beyond the jurisdiction of the courts of Indiana, and not licensed. The principal purpose of the act is to protect the public from quacks, and from persons or firms, not licensed, but who, as nonresident manufacturers of eyeglasses, employ licensed optometrists to conduct the manufacturer's business in Indiana for profit. The act prohibits such employment. It is not for the court to say that the legislature was without authority to enact a law condemning that relationship and practice.

The act further forbids certain advertisements and publications likely to mislead and deceive the public. Bennett admitted on the witness stand that advertisements exhibited to him were distributed by handbills and through the medium of the press, and that they contained statements prohibited by the act. These advertisements were furnished and paid for by the unlicensed, nonresident manufacturers. Many acts similar to the Indiana act as to its regulatory provisions, said the court, have been upheld almost without dissent. That such acts are held to be a proper exercise of the police power for the purpose of safeguarding public health, and do not amount to the taking of property without due process of law or the denial of the equal protection of the law, has been asserted by the courts many times. The Indiana legislature has declared that the safety of the public and the health of the community require the safeguards that are placed around the practice of optometry and the court was unable to say that the act, as a whole, was not a valid exercise of the police power. The judgment of the lower court was therefore affirmed.—*Bennett v. Indiana State Board of Registration and Examination in Optometry et al. (Ind.), 7 N. E. (2d) 977.*

Medical Practice Acts: Osteopath's Qualifications for License Without Examination Based on Prior Practice.—Daley, an osteopath, applied for a writ of mandamus to require the department of education of New York to issue him, without examination, a license to practice osteopathy. The trial court refused to issue the writ and Daley appealed to the supreme court, appellate division, third department, New York.

Daley based his right to a license without examination primarily on section 14, c. 344, Laws of New York, 1907 (approved May 13, 1907), which provided in part that:

> any person who shall be actively engaged in the practice of osteopathy in the state of New York on the date of the passage of this act, . . . shall upon application . . . be granted, without examination, a license to practice osteopathy, provided application for such license be made within six months after the passage of this act.

Daley, apparently, had practiced osteopathy in New York from August 1901 to January 1907, at which date he left New York state and engaged in practice in New Jersey and Vermont. He did not apply for the license within the six month period but when he did apply, in 1932, he relied on an amendment passed in 1928 providing:

> In the event any person . . . who is not registered or licensed because of some error, misunderstanding, unintentional omission, or other cause which the regents may determine to be excusable, shall submit to the regents satisfactory proof that he possessed all the requirements prescribed by law at the time required for registration or license, or their equivalents, he may, by action of the regents, receive from the education department a license . . .

Daley, said the supreme court, was not practicing in New York when the act of 1907 was passed and hence did not possess the qualifications for licensure under that act. He contended, apparently, that his failure to obtain a license was due to error, misunderstanding or unintentional omission within the meaning of the 1928 amendment. But, said the court, Daley's departure and absence from New York, and his failure to practice in the state, were not due to any of those causes. The court was not prepared to hold that the legislature, by either act mentioned, intended to admit to the practice of osteopathy in New York, without an examination, all of those who were practicing osteopathy in other states when the 1907 act was enacted. The supreme court accordingly affirmed the judgment of the trial court denying a writ of mandamus.—*Daley v. Byrne (N. Y.), 295 N. Y. S. 452.*

Society Proceedings

COMING MEETINGS

American Academy of Orthopedic Surgeons, Los Angeles, Jan. 16-20. Dr. Carl E. Badgley, 1313 East Ann St., Ann Arbor, Mich., Secretary.

American Orthopsychiatric Association, Chicago, Feb. 24-26. Dr. Norvelle C. La Mar, 210 East 68th St., New York, Secretary.

Annual Congress on Medical Education and Licensure, Chicago, Feb. 14-15. Dr. W. D. Cutter, 535 North Dearborn St., Chicago, Secretary.

Middle Section, American Laryngological, Rhinological and Otological Society, St. Louis, Jan. 26. Dr. James B. Costen, Beaumont Bldg., St. Louis, Chairman.

Pacific Coast Surgical Association, Los Angeles, Feb. 22-25. Dr. H. Glenn Bell, University of California Hospital, San Francisco, Secretary.

Southern Section, American Laryngological, Rhinological and Otological Society, Atlanta, Ga., Jan. 24. Dr. Murdock S. Equen, 144 Ponce de Leon Ave. N.E., Atlanta, Ga., Chairman.

Western Section, American Laryngological, Rhinological and Otological Society, Santa Barbara, Calif., Jan. 29-30. Dr. Arthur C. Jones, Eastman Bldg., Boise, Idaho, Chairman.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers in continental United States and Canada for a period of three days. Periodicals are available from 1927 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

Am. J. Roentgenol. & Rad. Therapy, Springfield, Ill.

38: 677-820 (Nov.) 1937

Responsibilities of the Radiologist. B. R. Kirklin, Rochester, Minn.—p. 677.
Spinal Extradural Cyst and Kyphosis Dorsalis Juvenilis. R. B. Cloward and P. C. Bucy, Chicago.—p. 681.
*Calcification About the Posterior Portion of the Greater Tubercle of the Humerus: Differentiation from Supraspinatus Tendon Calcification: Report of Four Cases. J. J. Fahey and P. H. Harmon, Chicago.—p. 707.
Methods of Roentgen Examination of Gastro-Intestinal Tract. J. C. Bell, Louisville, Ky.—p. 711.
*Roentgen Treatment of Infection from Human Bite. R. M. Smith and W. F. Manges, Philadelphia.—p. 720.
Review of Literature on Experimental Roentgen Therapy. W. F. Manges and R. M. Smith, Philadelphia.—p. 726.
Treatment of Epitheliomas of Nasolabial Fold. O. N. Meland, Los Angeles.—p. 730.
Radium Treatment of Vernal Conjunctivitis. H. H. Bowing and R. E. Fricke, Rochester, Minn.—p. 740.
Cancer of the Eyelids. G. A. Robinson, New York.—p. 743.
Protective Shields in Radiation Therapy of Intra-Oral Cancer. A. J. Ackerman, New York.—p. 746.
Production of Supervoltage Roentgen Rays by Means of an Electrostatic Generator. R. Dresser, J. G. Trump and R. J. Van de Graaff, Boston. —p. 758.
Coordination of Physical and Biologic Dosage in High Voltage and Supervoltage Roentgen Therapy. T. Leucutia and K. E. Corrigan, Detroit.—p. 762.
Dosage Measurements on Ten 400 Kilovolts Roentgen-Ray Generators. O. Glasser, Cleveland.—p. 769.
Use of Pitressin for Elimination of Intestinal Gas in Roentgenography of Genito-Urinary Tract and Gallbladder. L. W. Paul, Kansas City, Mo., and S. R. Beatty, Madison, Wis.—p. 776.
Postural Treatment of Infant Colic. W. Snow, New York.—p. 779.
Visualization of Shatter-Proof Glass in Tissues. J. M. Dell Jr., Gainesville, Fla.—p. 781.

Calcification About the Greater Tubercle of the Humerus.—Fahey and Harmon report four cases of calcification about the greater tubercle of the humerus. Such instances are not uncommon; eighty cases of calcification in the supraspinatus tendon have been seen concomitantly at the University of Chicago Clinics. Differentiation from the more common supraspinatus calcification is readily made by an anteroposterior roentgenogram with the arm in internal rotation. Areas that may appear to be islands of bone in usual x-ray views of the shoulder are thus localized in relation to the greater tubercle. Supraspinatus calcification sometimes escapes and migrates laterally down the side of the greater tubercle. In these cases roentgenograms will show a shadow of calcium deposit distal to the location of the supraspinatus calcification and on the lateral aspect of the tubercle. When supraspinatus calcification is combined with calcification in the posterior tendons, the diagnosis is more readily made. In the only case in which operation was performed, calcification both inside and outside the infraspinatus tendon was found.

Roentgen Treatment of Infection from Human Bite.—Smith and Manges used roentgen rays in the treatment of nine cases of infection of the hand from human bites. It offers a simple method of treatment which will not interfere with surgical therapy commonly used, when necessary. There was no involvement of bone or joint in the present series of patients. This is not the usual course of events. All the patients had a short convalescent period. In only one case was convalescence prolonged and treatment was not started in this case until ten weeks after injury. This was the only one in which cauterization, as advocated by Bates, was employed. Material from wounds caused by human bites should be studied carefully in fresh smears in order to find the organisms. The part affected is treated by using a large area, with superficial irradiation: 135 kilovolts, 5 milliamperes, 4 mm. of aluminum filtration, at a distance of 12 inches. Each dose is between 50 and 100 roentgens. The frequency of dosage is determined by the patient's general condition and his reaction to the treatments. In some instances the treatment has been daily and in others it has been at weekly intervals. Relief from pain is usually prompt, in from six to twenty-four hours. The swelling subsides more slowly. The lymphangitis and lymphadenitis, when present, respond fairly rapidly. In the majority of instances the convalescent period lasts from one to two weeks. The temperature falls usually by crisis or steeply by lysis.

Annals of Internal Medicine, Lancaster, Pa.

11: 701-866 (Nov.) 1937

Thyroid Pituitary Relationship in Diabetes Insipidus. T. Findley Jr., St. Louis.—p. 701.
*Subacute Bacterial Endocarditis: Active Cases Without Bacteremia. C. S. Keefer, Boston.—p. 714.
Disturbances of Rate and Rhythm in Acute Coronary Artery Thrombosis. A. M. Master, S. Dack and H. L. Jaffe, New York.—p. 735.
Surgical Treatment of Peptic Ulcer. I. Abell, Louisville, Ky.—p. 762.
Reaction and Specific Gravity of the Urine in Relation to Nephritis (A Study of 10,000 Urinalyses). E. E. Ziegler and A. T. Brice, San Francisco.—p. 768.
Problems Connected with the Use of Protamine Zinc Insulin. H. T. Ricketts, Chicago.—p. 777.
Some of the Practical Problems in the Serum Therapy of Bacterial Infections. A. Wadsworth, Albany, N. Y.—p. 791.
*Comparative Value and Limitations of Trephine and Puncture Methods for Biopsy of Sternal Bone Marrow. W. Dameshek, H. H. Henstell and Eleanor H. Valentine, Boston.—p. 801.
Neurologic Manifestations in "Hypoglycemic Shock" (Sakel). L. A. Golden, New Orleans.—p. 819.
*Motor Involvement of the Central Nervous System in Pellagra: Report of Two Cases. M. A. Blankenhorn, Cincinnati.—p. 823.
Nutritional Disturbances of the Extreme South. J. H. Musser, New Orleans.—p. 827.
Coffee as a Cause of Cardiac Pain. R. L. Levy, New York.—p. 833.

Subacute Bacterial Endocarditis.—Keefer presents a summary of fifteen cases of bacterial endocarditis without bacteremia which he has observed during life and at postmortem examination, including the clinical features, the histologic picture of the valves and observations regarding the bactericidal activity of the blood. All the patients had physical signs of valvular disease. Nonsyphilitic aortic regurgitation was present in ten. Only the mitral valve was involved in two and the tricuspid alone in three. There was no essential difference in the clinical course of the patients with bacteremia and those without bacteremia with the possible exception that the patients without bacteremia were more apt to have renal insufficiency as a prominent feature of their illness. Bactericidal studies of the blood of patients with bacterial endocarditis show that some normal persons as well as patients with bacterial endocarditis have antibodies which are capable of killing organisms derived from patients with bacterial endocarditis. Bacterial endocarditis can be produced in animals under the same circumstances as exist in man: the presence of damaged valves, platelet thrombi on the valves, bacteremia and the presence of antibodies. There is highly suggestive evidence that the human cases in which blood cultures are negative have a condition analogous to the experimental endocarditis of horses as described by Wadsworth. It is well to recognize this group of cases, since their study aids in understanding the infection and should encourage one to look for ways of destroying organisms in the valves.

Trephine and Puncture Methods for Biopsy of Sternal Bone Marrow.—Dameshek and his associates compared, in twenty consecutive cases, the trephine and the recently popularized puncture methods for biopsy of the sternal marrow. A comparison of the smears made with the "trephine" and the "puncture" methods showed a far greater cellularity in the biopsy preparations, a greater reticulocyte percentage, a greater number of erythroblastic cells relative to granulocytes and a greater number of early nucleated red cells. The puncture preparations frequently consisted almost entirely of red blood cells, interspersed among which were some marrow cells. The sections obtained at biopsy gave one an idea not only of the general topography of the marrow but of its general degree of cellularity and the presence or absence of islands of leukemic or neoplastic cells and, in certain cases, of connective tissue replacement. Combined study of the sections and of the smears has proved to be of much greater value than study of the one type of preparation alone. Puncture biopsy of the sternum is

to be criticized because the material obtained is usually not marrow but a variable mixture of blood with marrow cells; because lack of cellularity in this aspirated material does not necessarily mean lack of cellularity in the marrow itself; because primitive erythroblastic cells, present in the marrow, are frequently not obtained, and because abnormal islands of neoplastic and leukemic cells are either not obtained or, if seen, may be misinterpreted because of the lack of topographic relationship. The chief advantage of puncture biopsy is its simplicity, but this is greatly outweighed by its inaccuracy.

Motor Involvement of Central Nervous System in Pellagra.—Blankenhorn cites two cases of pellagra, one resembling hemiplegia and the other diplegia; both patients were totally disabled and even "helpless," one for three weeks and the other for six weeks. With intensive dietary treatment both became well. In each case chronic alcoholism was the obvious predisposing cause of pellagra, but it is now generally believed that "alcoholic pellagra" and endemic pellagra are the same disease. The remarkable recovery of the patients, when treated as pellagrins, suggests that the motor involvement of the central nervous system was really part of the syndrome of pellagra.

Annals of Medical History, New York

9: 517-586 (Nov.) 1937

A Portrait Gallery of Physicians: The Collection in the Army Medical Library. H. W. Jones, Washington, D. C.—p. 517.
William Cheselden: Some of His Contemporaries, and Their American Pupils. F. R. Packard, Philadelphia.—p. 533.
The Rise of British Surgery in the Eighteenth Century. F. Beekman, New York.—p. 549.
The Famous Case of Lady Anne Conway. G. R. Owen, Los Angeles. —p. 567.

Archives of Dermatology and Syphilology, Chicago

36: 1129-1312 (Dec.) 1937

The Processes and Organization of Graduate Medical Education: President's Address. J. H. Stokes, Philadelphia.—p. 1129.
Epulis Granulomatosa. S. Ayres Jr. and N. P. Anderson, Los Angeles. —p. 1149.
Epidermophytosis: Report of Cases in Three Brothers, One of Whom Showed a Hitherto Undescribed Clinical Type on the Scalp. H. C. Gjessing and K. Mossige, Oslo, Norway.—p. 1154.
*Reactions to Mapharsen, with Especial Reference to Its Use in Patients Who React to Arsphenamines. J. W. Jordon and H. L. Traenkle, Buffalo.—p. 1158.
Sensitization of Guinea Pigs to Poison Ivy. J. E. Ginsberg, Chicago; F. T. Becker, Minneapolis, and S. W. Becker, Chicago.—p. 1165.
A Method of Staining Hair and Epithelial Scales. D. A. Berberian, Beirut, Syria.—p. 1171.
Superficial Lymphatic Capillary Network of the Skin: Its Demonstration in Various Cutaneous Diseases. O. L. Levin, S. H. Silvers and S. S. Berkowitz, New York.—p. 1176.
Sense of Smell of Patients with Neurosyphilis, Especially of Those with Dementia Paralytica. L. W. Darrah, Northampton, Mass.—p. 1181.
Cutaneous Leprosy: Presumable Cure by Surgical Removal of Lesion. N. E. Wayson, Staten Island, N. Y.—p. 1185.
Dermatitis of Buttocks Due to Saligenin. H. A. Brunsting and L. A. Brunsting, Rochester, Minn.—p. 1187.
Lacquered Hairpins Holding Psyche Knot Probable Cause of Lichenified Eczema of Scalp: Report of Case. M. H. Goodman, Baltimore. —p. 1191.
Ringworm of the Scalp: V. Mechanism of Cure of Infections Caused by Microsporon Lanosum. G. M. Lewis and Mary E. Hopper, New York.—p. 1194.
Dermatology in Art. L. Goldman, Cincinnati.—p. 1197.
Naevus Syringadenomatosus Papilliferus (Werther): Report of Five Cases. W. Sachs, Jersey City, N. J., and G. M. Lewis, New York. —p. 1202.
Naevus Acneiformis Unilateralis (Naevus Follicularis Keratosus): Report of Case. A. Sayer, New York.—p. 1210.
Arthur Van Harlingen: A Patriarch in American Dermatology. P. E. Bechet, New York.—p. 1217.

Reactions to Mapharsen.—During the last two years Jordon and Traenkle employed mapharsen as a routine in the treatment of patients who reacted severely to arsphenamines. In most instances mapharsen was employed only for patients who had repeated reactions to one or more of the other arsenicals. The group of patients consisted of "persistent reactors." A total of 154 patients who had reacted to arsphenamines were given 1,126 injections of mapharsen. Of these, follow-up was possible in 110, who had received 1,024 injections. The reactions were gastro-intestinal, nitritoid, cutaneous and postarsphenamine jaundice. Sixty-four patients who had had repeated severe gastro-intestinal reactions were treated with mapharsen. Of these, fifty-three tolerated the drug well; that is, with little or no further discomfort. In the eleven patients who were intolerant to mapharsen, the reactions appeared shortly after administration of the drug was begun. Twenty patients who had had severe repeated nitritoid reactions from treatment with one or more other arsenicals were given mapharsen and none showed a nitritoid reaction. The drug could be used in full dosage without danger of such a reaction. However, in three of the patients a different type of reaction appeared, in two gastro-intestinal and in one severe headaches. Administration of the drug to these three patients was stopped. Eighteen patients who had had postarsphenamine jaundice (at varying intervals after recovery) were further treated with mapharsen. Of these, sixteen tolerated the treatment well. In the other two jaundice developed in one patient after three injections of 0.03 Gm. and in the other after twelve injections of 0.04 Gm. Both patients had an uneventful recovery when administration of the drug was stopped. Eight patients who had had various types of cutaneous reactions to other arsenicals were treated with mapharsen. Five of the seven patients who had had minor arsphenamine dermatitis tolerated mapharsen well. One who had had severe crustaceous dermatitis was unable to tolerate the drug.

Arch. of Physical Therapy, X-Ray, Radium, Chicago

18: 673-736 (Nov.) 1937

Effect of Heat Applied by Elliott Treatment and Short Wave Diathermy on Blood and Lymph Flow of Intestine and Colon: Experimental Study in the Dog. C. R. Schmidt, J. M. Beazell and A. C. Ivy, Chicago.—p. 677.
Experiments with Decimeter Wave Therapy. Martha Brünner-Ornstein, Vienna, Austria.—p. 684.
Physical Therapy of Fibrositis. F. H. Krusen, Rochester, Minn.—p. 687.
Terminology Relating to Medical Hyperthermia. A. Bessemans, Ghent, Belgium.—p. 698.
Physical Aspects of Infra-Red Radiant Energy in Therapy. W. T. Anderson Jr., Newark, N. J.—p. 699.
Physical Measures in Traumatic and Functional Neuroses. N. H. Polmer, New Orleans.—p. 704.
Treatment of Birth Injuries and Related Problems. E. R. Carlson, New York.—p. 708.
The Spastic Child. F. H. Ewerhardt, St. Louis.—p. 711.

Archives of Surgery, Chicago

35: 1031-1208 (Dec.) 1937

*Nonspecific Mesenteric Lymphadenitis: Report of Seventy-Five Cases. S. Rosenburg, Pittsburgh.—p. 1031.
Sciatic Scoliosis: Clinical Analysis of Eighty Cases. M. A. Levine, Los Angeles.—p. 1045.
Multiple Peripheral Aneurysms Associated with Nonsyphilitic Degeneration of Tunica Media. W. DeW. Andrus and L. Hellman, New York. —p. 1052.
Anhydremia as Factor in Death from Autolytic Peritonitis. G. Iesu, Naples, Italy.—p. 1074.
Discharges from the Nipple: Their Clinical Significance and Mammographic Interpretation. N. F. Hicken, R. R. Best and H. B. Hunt, Omaha.—p. 1079.
*Does Operative Fusion of Tuberculous Joints Produce Tuberculous Meningitis? F. L. Liebolt, New York.—p. 1095.
Clinical and Experimental Operations on Gallbladder and Common Duct: Results of Primary Suture. G. L. McWhorter, Chicago.—p. 1099.
Thrombo-Angiitis Obliterans and Typhus: Evidence of Etiologic Relationship. C. Goodman, New York.—p. 1126.
Alterations in Hip Joint After Deafferentation. K. B. Corbin, Stanford University, Calif.—p. 1145.
Malignant Tumors of Meckel's Diverticulum: Report of Case of Leiomyosarcoma. K. K. Nygaard and W. Walters, Rochester, Minn. —p. 1159.
Olfactometry in Cases of Acute Head Injury. P. P. Goland, New York. —p. 1173.
Sixty-Fourth Report of Progress in Orthopedic Surgery. J. G. Kuhns, E. F. Cave, S. M. Roberts, R. J. Joplin and W. Elliston, Boston; J. A. Freiberg, Cincinnati; J. E. Milgram, New York, and R. I. Stirling, Edinburgh, Scotland.—p. 1183.

Nonspecific Mesenteric Lymphadenitis. — Rosenburg makes a clinical classification of nonspecific mesenteric lymphadenitis into chronic, acute, acute fulminating and acute suppurative mesenteric lymphadenitis. He discusses the subject from the point of view of (1) diagnosis, which is often obscure; (2) etiology, which is still in doubt, and (3) treatment and prognosis. Diagnosis of the chronic type resolves itself into an elimination of other causes of the presenting symptoms. The acute variety is often confused with acute appendicitis, and operation is usually required to decide the issue. Concerning the cause, tuberculin tests indicated that the tubercle bacillus is not the offending organism. Cultures and sections in six glands failed to show evidence of pyogenic or tuberculous infec-

tion. There is a definite seasonal incidence, perhaps related to infection of the upper part of the respiratory tract. Foci of infection are probably important etiologic factors. In twenty-three of the seventy-five cases reviewed, tonsillectomy and adenoidectomy had been done previous to operation, thus eliminating the tonsils and adenoids as a source of infection. Of twenty-nine replies to follow-up letters, two thirds of the patients still had abdominal pain after laparotomy. Postoperative supportive measures are probably of great value in the alleviation of symptoms.

Fusion of Tuberculous Joints and Tuberculous Meningitis.—Liebolt points out that during the twenty-three year period from 1889 to 1912, before operative fusions came into use and when all tuberculous patients were treated conservatively, 1,398 persons with tuberculosis were admitted to the hospital, on whom no operations other than aspirations were performed. However, 149, or 10.6 per cent, of these patients died of tuberculous meningitis, an average of six and one-half deaths a year. During a similar length of time (from 1912 to 1935) when operative fusion was performed there were 1,752 patients with tuberculosis admitted to the hospital, on whom 1,941 operations were performed. Only twenty-three of these patients, however, died of tuberculous meningitis. This is a percentage of 1.3 for patients admitted and 1.1 for operations performed, with an average of one death a year. Eight of the twenty-three deaths occurring between 1912 and 1935 were of patients on whom no operations had been performed because of their delicate condition at the time of admission and during their stay in the hospital. If these eight deaths were eliminated the percentage of deaths for those patients who were operated on would drop from 1.1 to 0.77. Postmortem examinations were made on all but four of the fifteen patients operated on. The diagnosis of tuberculous meningitis was confirmed in each case. In only one patient was the fusion definitely solid—a patient with tuberculosis of the spine; in four the status of the joint was not known and in eighteen fusion was not present. This, therefore, is evidence that lack of either operative or natural fusion of a tuberculous joint is in many cases a predisposing factor to tuberculous meningitis. Surgical intervention in a tuberculous joint does not produce tuberculous meningitis.

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California and Western Medicine, San Francisco

47: 289-360 (Nov.) 1937

Pseudobiliary Dyskinesia. S. H. Mentzer, San Francisco.—p. 296.
Social Security Act: In Relation to Maternal and Child Health. Ellen Stadtmuller, San Francisco.—p. 301.
Plastic Operation on Pelvis of a Solitary Kidney. J. A. Dougherty, Oakland.—p. 307.
Physical Defects in Mentally Retarded School Children. Marian Goldwasser, Los Angeles.—p. 310.
Skin and Chemical Tests for Pregnancy. R. D. Dunn, P. Hoffmann and Florence Fouch, San Francisco.—p. 315.
Scleroma in California. H. E. Alderson, San Francisco.—p. 317.

Illinois Medical Journal, Chicago

72: 377-468 (Nov.) 1937

Pneumonia in Childhood: Etiology and Classification. J. Brennemann, Chicago.—p. 397.
Symptomatology and Diagnosis of Pneumonia in Children. W. L. Crawford, Rockford.—p. 401.
Complications, Sequels and Prognosis of Pneumonia in Infants and Children. J. Vonachen, Peoria.—p. 402.
Treatment of Pneumonia in Children. J. K. Calvin, Chicago.—p. 406.
Saddle Nose: Report on Use of Ivory and Cartilage Implants. S. Salinger, Chicago.—p. 412.
Myxedema Heart. V. T. Austin, Urbana.—p. 417.
Growth Deformities Resulting from Osteomyelitis. J. A. Siegling, Urbana.—p. 422.
The Diagnosis of Bronchogenic Carcinoma: Roentgen Aspects. A. Hartung and T. J. Wachowski, Chicago.—p. 426.
Id.: Bronchoscopic Aspects. P. H. Holinger, Chicago.—p. 431.
Radiographic Differentiation of Silicosis and Anthracosis. R. T. Pettit, Ottawa.—p. 434.
The Convalescent Care of Anterior Poliomyelitis. S. Sideman, Chicago.—p. 439.
The Control of Menopausal Symptoms. H. Swanberg, Quincy.—p. 441.
The Management of the Third Stage of Labor. H. Williamson, Danville.—p. 445.
Report of Maternal Welfare Committee. F. H. Falls, Chicago.—p. 450.
Problems of a Health Officer in a Town of 40,000 People. H. O. Collins, Quincy.—p. 451.
Endometriosis. F. O. Priest, Chicago.—p. 454.
Malaria, with Especial Reference to Narcotism. I. F. Volini and W. W. Shapiro, Chicago.—p. 458.

Johns Hopkins Hospital Bulletin, Baltimore

61: 295-370 (Nov.) 1937

Lesions of Rectus Abdominis Muscle Simulating an Acute Intra-Abdominal Condition: I. Anatomy of Rectus Muscle. T. S. Cullen and M. Brödel, Baltimore.—p. 295.
Id.: II. Hemorrhage Into or Beneath Rectus Muscle Simulating Acute Abdominal Condition. T. S. Cullen, Baltimore.—p. 317.
Correlation of Respiratory Quotient to Glycogen Reserves. E. M. Bridge, Baltimore.—p. 349.
Presence of Multiple Agglutinins in Serum of Patients with Chronic Rheumatoid Arthritis. C. W. Wainwright, Baltimore.—p. 358.

Journal of Allergy, St. Louis

9: 1-104 (Nov.) 1937

Studies in Mucous Membrane Hypersensitiveness: II. Passive Local Sensitization of the Nasal Mucous Membrane. H. Sherman, C. Kaplan and M. Walzer, Brooklyn.—p. 1.
Association with Pseudoglobulin of Skin Sensitizing Substance of Allergic (Hay Fever) Serum. A. Stull, W. B. Sherman and R. A. Cooke, New York.—p. 7.
Anaphylaxis in Multiply Sensitive Guinea Pigs. H. N. Pratt, Boston.—p. 14.
*Therapeutic Value of Iodized Oil in Bronchial Asthma. L. H. Criep and J. A. Hampsey, Pittsburgh.—p. 23.
Sensitivity to House Dust and Goose Feathers in Infantile Eczema: Role of Specific Allergens. L. W. Hill, Boston.—p. 37.
Blood Surface Tension, Sedimentation Rate and Hypertensive Blood Pressure Responses Following Ingestion of Allergenic Foods. C. J. Sullivan and W. T. Vaughan, Richmond, Va.—p. 48.
Scorings in Long Bones as Guide in Management of Food Allergy in Children. M. B. Cohen and S. Friedmar, Cleveland.—p. 54.

Iodized Oil in Bronchial Asthma.—Criep and Hampsey consider the value of iodized oil in the treatment of bronchial asthma through a review of the literature, the treatment of forty cases of intractable asthma and 335 questionnaires. Of twenty patients treated by intratracheal insufflation, only three obtained prolonged relief. In seventeen cases the treatment was a total failure. Of ten patients who received oil following bronchoscopy, only one showed complete relief. A group of ten patients treated with iodized oil elsewhere failed to show either clinical improvement or loss of clinical sensitivity to substances to which they were allergic. Of the 230 replies received, 166 indicated no experience with this form of treatment and the remaining sixty-four replies revealed the following: 1. Only one third of the physicians who tried this therapeutic procedure are still using it, but, for the most part, only as an adjunct to medical and allergic management in a well selected group of asthma patients. 2. In bronchial asthma (267 cases) cure was obtained in 1.9 per cent, improvement in 24.7 per cent and failure in 73.4 per cent. 3. In asthmatic bronchitis (thirty-nine cases) cure was reported in 0.8 per cent, improvement in 22.8 per cent and failure in 76.4 per cent. The replies further demonstrated a particular lack of enthusiasm if not direct opposition to this form of therapy. Untoward reactions to iodized oil are reported by many. These reactions may be due to allergy to iodine and poppyseed oil, to circulatory failure, to spread of infection and to damage to pulmonary tissue. Fatal reactions are not rare.

Journal of General Physiology, New York

21: 123-268 (Nov.) 1937. Partial Index

Relationship Between Bacterial Growth and Phage Production. A. P. Krueger and J. Fong, Berkeley, Calif.—p. 137.
Relation Between Visual Acuity and Illumination. S. Shlaer, New York.—p. 165.
Intensity and Critical Frequency for Visual Flicker. W. J. Crozier, E. Wolf and G. Zerrahn-Wolf, Cambridge, Mass.—p. 203.
Phase Rule Study of Proteins of Blood Serum: III. Globulin. Eloise Jameson and Dorothy Brown Roberts, San Francisco.—p. 249.

Journal Industrial Hygiene & Toxicology, Baltimore

19: 469-512 (Nov.) 1937

Symptomatology of Chronic Poisoning with Oxides of Nitrogen. N. A. Vigdortschik, E. C. Andreeva, I. Z. Matussevitsch, M. M. Nikulina, L. M. Frumina and V. A. Striter, Leningrad, U. S. S. R.—p. 469.
Determination of Atmospheric Contaminants: I. Organic Halogen Compounds. H. B. Elkins, A. K. Hobby and J. E. Fuller, Boston.—p. 474.
Determination of Carbon Disulfide in Blood. J. R. Harrower and F. H. Wiley, Wilmington, Del.—p. 486.
*Lead Content of Evaporated Milk. L. T. Fairhall, Boston.—p. 491.
Radiation Experienced in Factories and Houses. H. M. Vernon, London, England.—p. 498.
Study of Chronic Chest Diseases Among Coal Miners in Shotts, Scotland. J. A. M. Hall, Shotts, Scotland.—p. 506.

Lead Content of Evaporated Milk.—To determine whether there is any contamination from the tin-lead alloy solder used in sealing cans of evaporated milk, Fairhall obtained samples of milk canned in widely separated sections

of the country. The milk was without exception purchased in retail establishments. Brands peculiar to a given locality were usually chosen in addition to the standard brands. Analytic determinations were made on two 100 Gm. samples taken from each can. The two methods used are independent and, of the two, the probability curve for the diphenylthiocarbazon method is the more symmetrical. The study fails to show any correlation between the age of the can of milk and the lead content. Four cans in which solder pellets had been introduced purposely and which had been standing for eight months showed no significant increase in the amount of lead dissolved in the milk. This is a somewhat definite indication that pellets of solder when present in the milk are apparently without significance. Analyses by the photometric method gave an average value of 7.6 micrograms per hundred grams of evaporated milk, or of 0.076 mg. per kilogram of milk. The results obtained with the diphenylthiocarbazon method gave an average value of 11 micrograms per hundred grams of evaporated milk, or 0.11 mg. per kilogram. On the basis of diluted milk the foregoing figures compare favorably with those obtained by Harwood and Turley on raw milk. It takes approximately 2.25 parts by weight of ordinary milk to produce 1 part by weight of evaporated milk. On the basis of ordinary milk then the values obtained by the two methods compare favorably with the value obtained by Harwood and Turley for raw milk alone. The presence of spectrographic traces of lead in raw milk has also been reported by Zbinden. Contamination of the product from the solder seal can be said to be of no hygienic significance.

Journal of Lab. and Clinical Medicine, St. Louis

23: 107-218 (Nov.) 1937

Aminopyrine Hypersensitivity. J. S. Davis Jr. and L. F. Frissell, New York.—p. 107.

Guanidine-like Substances in the Blood: IV. Blood Guanidine in Patients with Parathyroid Deficiency and with Idiopathic Tetany. J. E. Andes, Morgantown, W. Va., and V. C. Myers, Cleveland.—p. 123.

Experimental Studies on Long Continued Administration of Bismuth: Summary Form. H. R. Fishback and Dora Fishback, Chicago.—p. 127.

Mumps: Incidence of Palpable Splenic Enlargement and of "Complications," and Their Relation to Salivary Gland Involvement as Evidence That the Disease Is a Systemic Infection. J. A. Greene and R. H. Heeren, Iowa City.—p. 129.

*Successful Treatment of Persistent Extreme Dyspnea "Status Asthmaticus": Use of Theophylline with Ethylene Diamine, U. S. P. (Aminophylline), Intravenously. G. Herrmann and M. B. Aynesworth, Galveston, Texas, with the help of J. Martin.—p. 135.

Urinary Iron Excretion. Adelaide P. Barer and W. M. Fowler, Iowa City.—p. 148.

Use of Mercurial Diuretics: Case Report with Autopsy Findings. F. G. Norbury, Jacksonville, Ill.—p. 156.

Effect of Staphylococcus Antitoxin on Rabbits Given Broth Cultures of Staphylococci Intravenously. R. H. Rigdon, Nashville, Tenn.—p. 159.

Preservation of Sputum for Pneumococcus Type Differentiation. A. H. Harris and F. M. Varley, Albany, N. Y.—p. 164.

Determination of Platelet Volume. I. Olef, Boston.—p. 166.

Determination of Total Protein, Sugar and Chlorides in Cerebrospinal Fluid. A. Bernhard, New York.—p. 179.

Modification of Technic of Neufeld Reaction in Typing of Pneumococci. W. H. Roehl, Middletown, Ohio.—p. 180.

Some Practical Aspects of Routine Performance of the Kahn Test. M. Pearl Spanswick and R. G. Synder, Iowa City.—p. 181.

Improved Method for Determination of Urine Urea Nitrogen by Direct Nesslerization. W. F. Taylor, E. R. Hayes and B. B. Wells, Dallas, Texas.—p. 188.

Rapid Preparation of Tapeworm Proglottids for Diagnostic and Teaching Purposes. G. J. Dammin, New York.—p. 192.

Comparison of Urea Methods. S. R. Seljeskog and J. W. Cavett, Minneapolis.—p. 194.

*Serum Volume Test for Hemorrhagic Diathesis in Jaundice. F. F. Boyce and Elizabeth M. McFetridge, New Orleans.—p. 202.

Treatment of Persistent Extreme Dyspnea.—For the last six years Herrmann and Aynesworth have been using the intravenous injection of theophylline in doses of 0.48 Gm. in 10 cc. of saline solution for the relief of persistent extreme dyspnea, "status asthmaticus" and "epinephrine fast" asthma. The solution has been given slowly through a small needle in order to avoid unpleasant reactions. Such reactions, however, have occurred fairly frequently in spite of all precautions but have been only slightly unpleasant and never serious. Most of the patients complain of a momentary feeling of heat in the skin, particularly of the face, burning in the eyes, sometimes a sense of constriction in the chest, occasionally nausea and vomiting and in rare instances cerebral manifestations, twitching, convulsion and coma. There have not, however, been any fatalities as a result of the injection of this drug. In the sixteen clinical cases of asthmatic bronchitis or chronic bronchial asthma presenting attacks of status asthmaticus, forty-one injections of theophylline with ethylene diamine have been administered intravenously as emergency therapy, usually with success after epinephrine had been ineffectual. Of these forty-one injections thirty-one afforded prompt, complete and persistent relief, but at least six of these were of the half dosage of 0.24 Gm. In two instances the full dose of 0.48 Gm. seemingly failed. Theophylline with ethylene diamine in 0.48 Gm. doses diluted to 10 cc. and slowly introduced intravenously seems to be a most effective, prompt, reliable and safe therapeutic procedure for the combating of status asthmaticus even after a refractoriness to epinephrine has developed.

Test for Hemorrhagic Diathesis in Jaundice.—Boyce and McFetridge outline a test which they are certain is a reliable indication of the bleeding tendency in jaundice. An arbitrary amount of blood, preferably 3 cc., is collected in a graduated tube and allowed to stand at room temperature for four hours, at the end of which time the clot is removed and studied for firmness, retractility and similar characteristics. The serum volume is then read and the index calculated. In a control group of twenty-five nonjaundiced and apparently normal male subjects, with blood counts, platelet counts, coagulation time and bleeding time within normal limits, they found that at four hours the serum volume was equivalent to 50 per cent of the blood volume. The same ratio was maintained in some of their twenty-two jaundiced patients, while in others, notably the patient who furnished them with the clue and who proved the case, as it were, by her frank purpura, the serum volume was decidedly below this level. They therefore developed a serum volume index, which equals the serum volume of the patient studied over half the volume of the blood withdrawn for the study. They consider 1 as the standard of normal and consider indexes below this normal as progressively indicative of a tendency to hemorrhage. The retractility of the clot is always related to the level of the index and serves as an additional check. Only one precaution is necessary, a routine blood count to demonstrate a possible anemia. If anemia is present, the serum volume will be greater than half the blood volume and the proper correction must be made when the index is calculated. The use of the serum volume test is suggested postoperatively, after choledochostomy, to determine how long drainage may be continued safely. Often in such cases prolonged drainage is indicated, and yet such patients under such circumstances sometimes develop a tendency to hemorrhage which was not present preoperatively. It is believed that the serum volume test will furnish a reliable index of this new tendency.

Journal of Nutrition, Philadelphia

14: 435-534 (Nov.) 1937

Comparative Nutritive Values of Glucose, Fructose, Sucrose and Lactose When Incorporated in Complete Diet. H. H. Mitchell, T. S. Hamilton and Jessie R. Beadles, Urbana, Ill.—p. 435.

Activatability of Milk as Affected by Feeding Ergosterol to Cows. R. F. Light, L. T. Wilson and C. N. Frey.—p. 453.

Survival of Completely Depancreatized Dog. I. L. Chaikoff and A. Kaplan, Berkeley, Calif.—p. 459.

Environmental Temperature as Factor in Production and in Cure of Rickets in the Rat. N. B. Guerrant, R. A. Dutcher and Ruth Crowthers, State College, Pa.—p. 471.

Further Studies on Effect of Excessive Vitamin A on Estrous Cycle of the Rat. T. C. Sherwood, O. R. Depp, G. P. Birge and H. B. Dotson, Lexington, Ky.—p. 481.

Respiratory Metabolism of Rats Receiving a Diet Deficient in Inorganic Constituents: Change in Basal Metabolism. M. Kriss and A. H. Smith, New Haven, Conn.—p. 487.

Vitamins A, C and D in Maize as Affected by Variety and Stage of Growth. W. B. Esselen Jr., C. R. Fellers and B. Isgur, Amherst, Mass.—p. 503.

Effect of Oral Administration of Pancreatin on Fecal Nitrogen and Fat Loss in Achylia Pancreatica. C. R. Schmidt, J. M. Beazell, P. J. Crittenden and A. C. Ivy, Chicago.—p. 513.

Utilization of Energy Producing Nutriment and Protein as Affected by Deficiency of Iron and Copper. A. Black, O. J. Kahlenberg, J. W. Bratzler and E. B. Forbes, State College, Pa.—p. 521.

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Journal of Pharmacology & Exper. Therap., Baltimore

61: 205-328 (Nov.) 1937

Action of Isopropylantipyrine in Animal Experiments. K. Fromherz. —p. 205.

Relation of Potassium to the Blood Pressure Response to Epinephrine. P. S. Larson and G. Brewer, Washington, D. C.—p. 213.

Effect of Histamine on Salivary Secretion. O. S. Gibbs and H. H. McClanahan, Memphis, Tenn.—p. 218.

Antagonistic Action of Morphine and Atropine on Human Stomach. H. O. Veach, Columbus, Ohio.—p. 230.

Effects of Ether, Chloroform and Cyclopropane on Cardiac Automaticity. W. J. Meek, H. R. Hathaway and O. S. Orth, Madison, Wis.—p. 240.

*Chemotherapy of Experimental Streptococcic Infections of Rabbits, with Especial Reference to Pyridine Compounds and Prontosil Soluble. J. A. Kolmer, H. Brown and G. W. Raiziss, with assistance of Anna M. Rule and L. W. Clemence, Philadelphia.—p. 253.

Microscopic Observations of Bronchiolar Reactions. T. Sollmann and A. J. Gilbert, Cleveland.—p. 272.

*Sensitivity of Diphtheritic Heart to Digitalis. C. W. Edmunds, R. G. Smith and C. A. Moyer, Ann Arbor, Mich.—p. 286.

Studies on Denervated Kidney: III. Effect of Ergotamine and Atropine on Uricosuric Effect of Cinchophen. G. P. Grabfield, B. Prescott and W. K. Swan, Boston.—p. 293.

Effects of Ingested Lead on Organism: I. Studies on the Rat. M. K. Horwitt and G. R. Cowgill, New Haven, Conn.—p. 300.

Action of *p*-Aminophenol on Certain Tissue Oxidations. F. Bernheim, Mary L. C. Bernheim and H. O. Michel, Durham, N. C.—p. 311.

Hydrolysis of Acetanilid by Various Tissues. H. O. Michel, F. Bernheim and Mary L. C. Bernheim, Durham, N. C.—p. 321.

Chemotherapy of Experimental Streptococcic Infections.—Kolmer and his collaborators believe that the purpose of the chemotherapy of septicemia and especially of the surgical types due to infection with streptococci and staphylococci should be not only disinfection of the blood by the promotion of phagocytosis and bactericidal action but, likewise and even more importantly, disinfection of the primary and secondary local infections of the fixed tissues so likely to be present. For this reason they believe that experimental septicemia induced by local infection is particularly applicable for chemotherapeutic investigation and that, in rabbits employed in their study, it has appeared quite helpful since the influence of the compounds employed may be directly observed clinically along with cultures of the lesions and blood for evidences of disinfection as compared with untreated controls. Since septicemia due to hemolytic streptococci is usually due to a rapid overflow of organisms into the blood from a primary infection of the fixed tissues which cannot be effectively balanced by the clearing mechanism, the primary purpose of treatment is to provide adequate drainage whenever possible supplemented by such biologic and chemotherapeutic measures as will aid disinfection of the fixed tissues, the blood and the clearing mechanism. Particularly encouraging results have been observed with two pyridine compounds containing an amino group or an amino group with iodine and especially with 2-2′ pyridyl sulfide dihydrobromide, since the effects have been similar to those observed with "prontosil solution" in similar amounts per kilogram of weight. From a comparative study of compounds having a pyridine nucleus with those having a benzene nucleus, it would appear that the former offers greater possibilities than the latter and particularly when containing divalent sulfur in the molecule.

Sensitivity of Diphtheritic Heart to Digitalis.—To study the increased sensitivity of the diphtheritic heart to digitalis, Edmunds and his associates injected a large series of guinea pigs with a small dose of toxin and after five days gave the animals four-fifths the minimal lethal dose of strophanthin or of tincture of digitalis. The results were not conclusive probably because the intoxication had not progressed far enough, the animals being active, running around the pen in spite of an average loss of 12 per cent of body weight. There was a slight increase in susceptibility toward strophanthin but apparently not to digitalis, although the difference in mortality between those receiving toxin and the normal controls was not significant. Ten cats were injected subcutaneously with 0.005 cc. of diphtheria toxin per kilogram of body weight and after a few days when they showed definite signs of illness but were still in fair condition the lethal dose of digitalis was determined. The cats were anesthetized with urethane given intraperitoneally and the standard digitalis powder in the form of a 0.5 per cent infusion was injected intravenously at a uniform rate. On the basis of the original weights of the cats, the minimal lethal dose of digitalis for the toxin series is 65 per cent of the dose required by the normal animal and on the basis of the weight at the time the digitalis test was carried out it was 74 per cent, clearly demonstrating the increased susceptibility of the digitalis heart over the normal organ. The minimal lethal dose of the cats with cardiac irregularities is about 75 per cent of the dose for the diphtheritic animal having normal rhythm. The observations are in harmony with the statement of von Kiss that full dosage of digitalis is to be avoided in cases of conduction injury, as the drug possesses a peculiar affinity for the conducting system and if this system is damaged by the toxin a therapeutic dose of digitalis may produce a complete block from a latent one.

Michigan State Medical Society Journal, Lansing

36: 805-924 (Nov.) 1937

*The Diabetic Problem as Influenced by Protamine Insulin. E. P. Joslin, Boston.—p. 819.

*Migraine: A Disorder of the Sympathetic Nervous System. W. H. Riley, Battle Creek.—p. 831.

Toxic Hepatitis. R. C. Connelly, Detroit.—p. 839.

Ocular Symptoms and Signs of Brain Tumor. C. S. O'Brien, Iowa City.—p. 844.

Incidence of Seizures in Families of Extramural Patients with Epilepsy. L. E. Himler, Ann Arbor.—p. 846.

Cannabis Sativa. W. H. MacCraken. Detroit.—p. 848.

Intranasal Administration of a Pertussis Antigen. S. S. Schooten, Detroit.—p. 849.

Autogenous Vaccines in Hay Fever. W. C. Behen, Lansing.—p. 852.

The Diabetic Problem as Influenced by Protamine Zinc Insulin.—Joslin points out that protamine zinc insulin has probably increased the number of diabetic patients using insulin in the United States by 70,000. This has come about not because of what doctors have said concerning it but because diabetic patients generally recognize the value of insulin, and the simplicity of taking it only once a day has encouraged many to use it who avoided it heretofore. The fact that during the brief period of one or two years the number of insulin users has increased so much demonstrates that the problem of the management of diabetes in this country is changing rapidly. And there is good reason for this change. The rising incidence of diabetes in the United States is due first of all to the more systematic search for diabetic patients and the closer medical supervision of the population in general; secondly, many more people now live beyond the age of 40 years, when the onset of diabetes is twice as frequent as it is in the interval between birth and 40 years; thirdly, diabetic patients live much longer than they used to. Two other factors may be the changing diet and the lessened participation in muscular work. One of the commonest errors is to expect results from protamine zinc insulin within the first few days of administration. A diabetic patient has twenty years or more ahead of him and one need not hurry. It is safer to proceed slowly. One must allow time for it to act and actually more time is demanded to change a patient who has been living on regular insulin to protamine zinc insulin than is necessary to start a fresh patient on protamine zinc insulin.

Migraine: A Disorder of the Sympathetic Nervous System.—In addition to the fundamental and essential condition (inherited functional disorder of the sympathetic nervous system) of migraine Riley mentions the following: (1) the relation of age to attacks of migraine, (2) the fact that among the exciting causes may also be mentioned depressive emotions, such as those associated with worry, anxiety, fear and anger, fatigue, exhaustion, loss of sleep, eye strain, errors of refraction, excessive use of the eyes, using the eyes in a bright light, (3) sensitization to certain foods and certain toxins, (4) increased alkalinity of the blood and (5) a spasm or contraction of the arteries in the meninges and cortical centers of the large brain. The immediate cause of the pain is the contraction and spasm of the meningeal arteries, which pinch the sensory nerves in the walls of the meningeal arteries. The spasm of the arteries supplying blood to the different cortical centers is undoubtedly responsible for many of the other symptoms associated with the headache, such as temporary blindness, homonomous hemianopia, aphasia, temporary loss of sensation and temporary motor paralysis of certain parts of the body.

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The attacks of severe vertigo which frequently accompany an attack of headache are undoubtedly due to a spasm of the arteries and a change in the circulation in the labyrinth and vestibular apparatus and connecting neural pathways of the internal ear.

New England Journal of Medicine, Boston

217: 765-804 (Nov. 11) 1937

The Clinical Aspects of Ectopic Pregnancy. J. Rock, Brookline, Mass. —p. 765.
Hydatidiform Mole and Chorionepithelioma. L. E. Phaneuf, Boston. —p. 770.
Abortion. J. R. McCord, Atlanta, Ga.—p. 776.
Treatment of Chronic Alcoholism. R. Fleming, Boston.—p. 779.
Criteria for Diagnosis of Coronary Disease. P. D. White, Boston. —p. 783.

217: 805-852 (Nov. 18) 1937

Fever Therapy. H. C. Solomon and I. Kopp, Boston.—p. 805.
Physiologic Principles in Treatment of Anemia. W. Dameshek, Boston. —p. 815.
Suction-Pressure Therapy in Peripheral Vascular Disease. E. E. O'Neil, Boston.—p. 828.
The Wisdom of the Human Body. R. C. Cabot, Cambridge, Mass.—p. 833.

New Jersey Medical Society Journal, Trenton

34: 649-710 (Nov.) 1937

The Union County Medical Society: President's Address, Oct. 13, 1937. E. P. Weigel, Plainfield.—p. 653.
The Academy of Medicine: Its Educational Value to the Doctor and the Public. M. Danzis, Newark.—p. 655.
Cancer Control: Organized Plan for Coordinated Action in a General Hospital. A. R. Casilli, Elizabeth.—p. 660.
Plastic Repair an Aid in Therapeutic Nasal Surgery. A. M. Mamlet, Newark.—p. 664.
Practical Results of Modern Cancer Research: The Second Harrison Stanford Martland Lecture of the Essex County Anatomic and Pathologic Society. J. Ewing, New York.—p. 667.
The Physician and His Prescriptions: Pharmaceutical Article Number Two. C. I. Ulmer, Gibbstown, and R. P. Fischelis, Trenton.—p. 673.
Missed Abortion: Maternal Welfare Article Number Twenty-One. C. H. Ill, Newark.—p. 675.
Address of Welcome to the American Hospital Association: Atlantic City, Monday, Sept. 13, 1937. W. G. Herrman, Asbury Park.—p. 676.

New York State Journal of Medicine, New York

37: 1891-1970 (Nov. 15) 1937

Spinal Anesthesia: Its Use and Limitations. O. C. King, Philadelphia. —p. 1891.
Role of Acute Infection in Hypertensive Cardiac Failure. J. R. Lisa and A. Ring, New York.—p. 1895.
Mantoux Test in Pediatrics: Increased Significance and Importance to the General Practitioner: Report of 1,000 Cases. J. Battaglia and F. L. Rosen, Brooklyn.—p. 1901.
Analgesia and Anesthesia in Obstetrics: Pentothal Sodium, Cyclopropane and Vinyl Ether. W. Bourne, Montreal.—p. 1905.
Telangiectases of the Brain Stem: Associated with Obstructive Hydrocephalus and Mental Deterioration. C. Davison and C. Rosenheck, New York.—p. 1909.
Bed Rest for Back Injuries. E. T. Wentworth, Rochester.—p. 1914.
*Tannic Acid Therapy in Allergy of Nasal Mucosa. H. A. Abramson, New York.—p. 1919.
Autotransfusion in Ectopic Pregnancy. A. J. Wallingford, Albany, —p. 1922.
Clinical Evaluation of Tertiary Butanol Hydrogen Peroxide as a Fungicide. F. C. Combes, New York.—p. 1927.
Treatment of Industrial Burn. J. J. Wittmer, Brooklyn.—p. 1931.
Diphtheria of the Skin. I. Pincus, New York.—p. 1938.

Tannic Acid Therapy in Allergy of Nasal Mucosa.—Abramson has used 0.5 per cent tannic acid in certain types of allergic rhinitis since 1935. The response of the normal mucous membrane to tannic acid varies. The same statement is true of allergic patients with various types of nasal complaints. A patient may refuse to use the tannic acid because of sneezing and irritation; in these cases it is to be discontinued. On the other hand, there are some individuals who use it continuously and find it in no way objectionable. It may be advisable in certain instances to use a higher concentration if the low concentration is well borne but there is only slight clinical improvement. In that event a 1 per cent solution may be prescribed. The patient should preferably use the solution with an all glass nebulizer and spray his nose from two to three times a day, depending on his reaction. Tannic acid does not agglutinate ragweed pollen or coagulate pollen protein with the same facility that it causes precipitation of other proteins or cells. Tannic acid has the remarkable property of sensitizing the surfaces of bacteria and red cells for phagocytosis. It is, perhaps, by a mechanism related to this surface action on unicellular organisms that a protective process may have been set up in the nasal mucosa in the instances in which relief was afforded in the cases yielding to this form of therapy.

Public Health Reports, Washington, D. C.

52: 1563-1598 (Nov. 5) 1937

General Aspects and Functions of the Sick Benefit Organization. R. R. Sayers, Gertrud Kroeger and W. M. Gafafer.—p. 1563.
*Treatment of Psoriasis with Massive Doses of Crystalline Vitamin D and Irradiated Ergosterol: Preliminary Report. E. T. Ceder and L. Zon. —p. 1580.
Pulmonary Tumors in Mice: IV. Lung Tumors Induced by Subcutaneous Injection of 1:2:5:6-Dibenzanthracene in Different Mediums and by Its Direct Contact with Lung Tissues. H. B. Andervont. —p. 1584.

52: 1599-1638 (Nov. 12) 1937

Protracted Incubation in Malarial Fever: Report of Case and Review of Literature. B. Mayne.—p. 1599.

Treatment of Psoriasis with Vitamin D.—While Ceder and Zon were employing massive doses of vitamin D, averaging 300,000 units daily, in the treatment of a series of cases of chronic arthritis, a complete involution of a widespread chronic psoriatic process occurred in a patient afflicted with both conditions. This suggested further application, and since April 1936 they have so treated fifteen cases of chronic widespread psoriasis; in three the process was distributed over the entire body. All the patients were between 30 and 50 years of age. Two were women and thirteen were men. In all cases the psoriasis had existed for several years, in some as long as twenty years, and was resistant to numerous remedies and without conspicuous spontaneous involution. Those who were being treated during the summer months were protected from natural sunlight radiation as much as possible. Each patient received orally from 300,000 to 400,000 units of irradiated ergosterol (vitamin D). Eleven patients showed a complete involution within from six to twelve weeks, two obtained only partial improvement within ten weeks of observation and two showed no benefit. The capsules were taken between meals. There were no untoward reactions during the course of treatment, with the exception of three individuals who developed the suggested evidence of hypervitaminosis D, characterized by anorexia, nausea, malaise and urinary frequency after from ten to twelve weeks of treatment. However, they had obtained their benefit by that time and treatment was about to be discontinued. These reactions were mild and caused no alarm or disability. Recurrences have occurred. Only one of the group of those who had a recurrence has been subjected to a repeated course of treatment. He has experienced two such attacks after an approximate interval of freedom of from two to three months, but the process was limited to the scalp on the first and second recurrences. He obtained equally good results by a repeated course of treatment in from eight to ten weeks.

Rhode Island Medical Journal, Providence

20: 169-188 (Nov.) 1937

Ophthalmic Reaction to Tryparsamide in Treatment of Neurosyphilis. W. M. Muncy, Providence.—p. 169.
The Modern Treatment of Neurosyphilis. H. E. Kiene, Providence. —p. 174.

Texas State Journal of Medicine, Fort Worth

33: 409-478 (Oct.) 1937

Modern Trends in Diagnosis and Medical Treatment of Lobar Pneumonia. M. D. Levy, Houston.—p. 414.
Serum Therapy in Lobar Pneumonia. W. H. Potts, Dallas.—p. 418.
X-Ray Therapy in Treatment of Pneumonia. F. T. McIntire and J. H. Smith, San Angelo.—p. 422.
Roentgen Rays in Diagnosis and Treatment of Pneumonia. E. V. Powell, Temple.—p. 427.
Physiotherapy in Treatment of Pneumonia. J. W. Torbett Jr., Marlin. —p. 432.
Surgical Complications and Sequels of Pneumonia. J. W. Duckett, Dallas.—p. 437.
Incidence of Pneumococcic Types in Dallas: Analysis of 340 Cases. C. B. Sanders, Dallas.—p. 442.
Postpneumonic Sequels in the Chest. W. W. Watkins, Phoenix, Ariz. —p. 443.
Geriatrics as a Modern Specialty. W. S. Horn, Fort Worth.—p. 448.
Pregnancy at Term in a Rudimentary Horn of a Bicornate Uterus: Internal Migration of a Fertilized Ovum, with Unusual Developmental Anomalies. M. E. Barrett, Fort Stockton.—p. 453.
New Growths of Air and Upper Food Passages. A. F. Clark, San Antonio.—p. 457.
Detachment of the Choroid. W. S. Webb, Fort Worth.—p. 460.

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An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2: 949-1004 (Nov. 13) 1937

Carcinoma of the Stomach. J. Morley.—p. 949.
Mastoid Operations. W. Howarth and G. Bateman.—p. 954.
*Disseminated Focal Pneumonia. J. G. Scadding.—p. 956.
Varix of the Neck. H. S. Barber.—p. 959.
Carcinoma of the Ureter: Report of Case. A. Lyall.—p. 961.
Spontaneous Subarachnoid Hemorrhage: Report of Case. A. Karmally, with notes on postmortem findings by K. D. Manohar.—p. 962.
*Reexpansion of Atelectatic Lower Lobe and Disappearance of Bronchiectasis. G. H. Jennings.—p. 963.

Disseminated Focal Pneumonia.—Scadding encountered four cases of acute or subacute pulmonary infection which seem to form a recognizable clinicoroentgenologic group, important because of the unusual and possibly prolonged course and the resemblance of the x-ray changes to those of pulmonary tuberculosis. The clinical and x-ray evidence suggests that the pulmonary lesion in these cases was essentially a pneumonia in small foci disseminated through lobes or parts of lobes of the lungs and liable to enter on a phase of delayed resolution. There arises the concept of a process characterized by pneumonic consolidation in small scattered foci; the individual foci at any time may be of different ages and at different stages of evolution toward resolution, organization or suppuration. They may clear almost completely or may leave more or less residual fibrosis. The process shows little of the tendency to a clear-cut termination seen in the more usual types of pneumonia, and may enter a subacute or chronic phase. If a case presenting this picture comes to necropsy, there will be little that is striking to the pathologist except the focal distribution of the lesions; the main interest of the picture is clinical. The symptoms differed clinically from those of other forms of pneumonia in several respects. The onset was not sudden, as in lobar pneumonia, and there was no evidence of a previous descending infection of the respiratory tract. The initial symptoms were mostly constitutional—malaise, headache, sweating and shivery sensations short of an actual rigor. Cough, at first dry, subsequently became productive of increasing amounts of purulent sputum, reaching a maximum after several weeks and continuing thereafter according to the progress of the case. Defervescence occurred in the fourth or fifth week, and symptoms, especially cough and sputum, continued for another week or two. The physical signs were most evident over the upper lobes in two cases and over the lower lobes in two. They consisted of moderate impairment of percussion note, weak breath sounds and numerous fine to medium râles. No definite consolidation signs were detected. Roentgenologically the picture consisted of areas of diffuse, rather coarse mottling, in foci varying from about 2 to 5 mm. in diameter. These changes were confined to the left upper lobe in one case and affected parts of more than one lobe in the rest. Resolution was slow in all but one case, in which it was not complete for at least twelve weeks from the onset. The resemblance of the infiltration to that of tuberculosis was at times striking. The most remarkable feature of the bacteriology of the sputum in these four cases was the absence of organisms usually associated with pneumonia. Only organisms that might be found in any respiratory tract were isolated. The etiology remains obscure. The existence of the syndrome calls for caution in the application of collapse therapy in cases in which pulmonary tuberculosis of acute onset is suspected on x-ray grounds without confirmation from bacteriologic examination.

Reexpansion in Atelectasis.—Jennings cites a case in which, in the course of an attack of acute bronchitis, with probable small areas of bronchopneumonia, an atelectasis of the lower left lobe developed. This possibly was due to plugging with secretion of the bronchioles in that lobe during a time when movements of the left lung were restricted owing to pleuritic pain. At all events, when sputum was coughed up later the lobe reexpanded. In this process it was assisted by respiratory exercises. A cylindric dilatation of the bronchi developed within the collapsed lobe. With reexpansion of the lobe the bronchi became of normal width. The lobe was collapsed for about a month. The case illustrated the possibility that bronchial dilatation in atelectatic lobes may disappear if the lobe reexpands. For this reason it is urged that methods for promoting early reexpansion of atelectatic lobes should be employed. Among these, postural and bronchoscopic drainage, inhalation of carbon dioxide and respiratory exercises have all been used with success. Not until such methods have been tried and the permanence of the atelectasis proved should lobectomy be considered.

East African Medical Journal, Nairobi

14: 219-248 (Oct.) 1937

Direct Injection of Lungs for Treatment of Pulmonary Tuberculosis. J. R. Roberts.—p. 221.

Edinburgh Medical Journal

44: 669-732 (Nov.) 1937

Survey of Volhard's Views on Hypertension and Hematogenous Bilateral Kidney Diseases. R. H. Goetz.—p. 669.
Clinical Recollections and Reflections: XVIII. Diagnosis. D. M. Lyon. —p. 685.
Harvey and the Human Heart. H. Yellowlees.—p. 695.
*Seasonal Variation in Tuberculosis as Illustrated in Study of Body Temperature and Body Weight. C. Clayson.—p. 707.

Seasonal Variation of Temperature and Weight in Tuberculosis.—Clayson avers that a seasonal fluctuation of body temperature is noticed in tuberculous patients who are observed for one or more complete years. Febrile disturbances of varying degrees are more common during February, March and April than at other times of the year. This change is more pronounced in adult women than in adult men. The change is observed also in tuberculous children. Seasonal variation occurs in the body weight of tuberculous patients, there being a tendency to lose weight during the late winter and early spring and a tendency to gain weight during the autumn and early winter. This trend would appear to be more pronounced in female cases. In children there is a period of slow growth in weight during the spring and early summer and of very rapid growth in weight during the late summer and early autumn. In adult patients the seasonal variation in weight bears a definite relationship to the amount of systemic disturbance. If the systemic factor is so pronounced as to cause rapid wasting, no seasonal change in weight is likely to be observed. In cases in which toxemia is slight but persistent, a well defined diminution in weight is apparent during February, March and April. In milder cases in which the systemic factor is slight and transient there is no decline in weight during the spring, but the gain in weight which is usually noted in these cases is temporarily interrupted. In cases in which the systemic factor is absent and the increase in weight is rapid, no seasonal trend is apparent.

International Journal of Psycho-Analysis, London

18: 373-504 (Oct.) 1937

Analysis Terminable and Interminable. S. Freud.—p. 373.
The Problem of the Genesis of Psychic Conflict in Earliest Infancy: Remarks on a Paper by Joan Riviere. R. Wälder.—p. 406.

Journal of Laryngology and Otology, London

52: 733-802 (Nov.) 1937

Pathology and Treatment of Carcinoma of Bronchus. F. C. Ormerod. —p. 733.
Air Cells of the Petrous Portion of the Temporal Bone. J. G. Wilson, J. P. Gaardsmoe and B. J. Anson.—p. 746.

Journal of Tropical Medicine and Hygiene, London

40: 257-276 (Nov. 1) 1937

Spermatogenesis and Fertilization in Philaenus Spumarius Fallen. A. Robertson and A. J. Gibbs.—p. 257.
Filarial Periodicity. C. Lane.—p. 262.
*Second Note on Infectivity to Man of Strain of Trypanosoma Rhodesiense: Resistance of Two African Volunteers to Infection. J. F. Corson.—p. 263.
Diseases of Skin in Negroes. L. J. A. Loewenthal.—p. 266.

Infectivity of Man to Strain of Trypanosoma Rhodesiense.—Corson describes experiments on four African volunteers in connection with the transmission of a strain of Trypanosoma rhodesiense maintained in sheep and antelopes since October 1934. The strain of Trypanosoma rhodesiense has been maintained from the beginning solely by cyclic transmission by Glossina morsitans and only through ruminants. Two of the four volunteers resisted infection. The trypano-

cidal action in vitro of the blood serum of three of the volunteers on this strain of trypanosomes was tested in 1936 by Fairbairn. Two isolated Glossina morsitans flies were used, and each was fed twice on a resistant volunteer and afterward infected another volunteer. Neither of the resistant volunteers showed a local skin reaction, while the infected volunteers showed local swelling. The infections in white rats that were bitten by these two flies before and after the dates on which the volunteers were bitten were similar and indicated no change in the virulence of the trypanosomes in either of the flies during their infective life. It seems that the two resistant volunteers were more resistant than the other two, and this suggests that in nature many persons are bitten by infective flies without becoming infected. Cases of inapparent infection may not be of rare occurrence and some infected people may recover spontaneously. It would be interesting if similar experiments with a suitable strain of trypanosomes were made on volunteers in Europe to see whether, like African natives, some are resistant. In such experiments the question of inapparent infections has to be considered.

Lancet, London

2: 1005-1060 (Oct. 30) 1937

The Problem of Assessing Psychiatric Treatment, as Illustrated by a Follow-Up of Eighty-Three Patients Seen at a General Hospital. D. Curran.—p. 1005.
Nutrition Surveys: Vitamin A Deficiency Among School Children in London and Cambridge. M. K. Maitra and L. J. Harris.—p. 1009.
Mycosis Fungoides D'Emblée. B. Portnoy.—p. 1015.
Ketonemia in Infancy. C. H. Gray.—p. 1017.
*Pharmacologic Actions of Sulfanilamide. F. Hawking.—p. 1019.

Pharmacologic Actions of Sulfanilamide.—In studying the pharmacologic action of sulfanilamide, Hawking observed that a solution of 1:1,000 was completely inert; thus it had no action on the intestine of the rabbit or uterus of the guinea pig suspended in vitro at 37 C., or on the heart of the frog perfused through the inferior vena cava. A cat, anesthetized with sodium barbiturate, was given intravenously 0.17 Gm. of the drug per kilogram of body weight in 1.5 per cent solution, and no effect could be observed on the blood pressure; similarly with a dog that also received 0.17 Gm. per kilogram of body weight. It has no trypanocidal action in vitro, trypanosomes withstanding a concentration of 1:400 for twenty-four hours at 37 C. In the light of these results, further investigations were made by administering very large doses to animals and observing the symptoms produced. Injections were made intraperitoneally, and they appeared to cause no irritation. Of ten rabbits, one received 0.4 Gm. per kilogram of body weight and showed no symptoms; two received 1 Gm. and one showed moderate symptoms; two received 1.5 Gm. and both showed marked symptoms; five received 2 Gm. and two of these died. Of two cats which received 2 Gm. per kilogram of body weight, one died after three days. The symptoms when shown were weakness of the legs, dyspnea, panting, general appearance of decerebrate rigidity and the like. Animals which survived were killed after a week and their organs were examined histologically. The liver, kidneys and other viscera showed no change due to the sulfanilamide. In three animals, which died from the drug, the central nervous system was examined; degenerative changes—e. g., chromatolysis—were observed in the neurons of the anterior column of the spinal cord and in some of the neural cells of the cortex and midbrain. The symptoms suggest that in acute poisoning by large doses of sulfanilamide the stress falls mainly on the central nervous system, apart from the dyspnea which is presumably due to the formation of sulfhemoglobin. The symptoms described have little significance for human therapy, since they were obtained only by the use of large doses; and although at one stage the animals appeared completely prostrated, most of them subsequently made a dramatic recovery.

Medical Journal of Australia, Sydney

2: 813-856 (Nov. 6) 1937

Tuberculosis in Australia. M. J. Holmes.—p. 813.
Some Comparative Aspects of Tuberculosis in Lower Animals. L. B. Bull.—p. 827.
Pathogenesis and Prophylaxis of Pulmonary Tuberculosis. C. Harvey.—p. 831.
Chronic Myocarditis. R. Whishaw.—p. 837.

Bull. et Mém. de la Soc. Méd. des Hôpitaux de Paris

53: 1377-1444 (Nov. 29) 1937. Partial Index

Acute Aleukemic Leukosis Simulating Erythema Nodosum and Terminating in Gangrene of the Penis. R. Kourilsky, A. Beauvy and P. Anglade.—p. 1378.
*Cardiovascular Disturbances in Myxedema. R. Froment and M. Jeune.—p. 1406.
Suprasellar Cholesteatoma. J. Dereux, E. Hartmann and J. Le Beau.—p. 1422.
Syndrome of Intracranial Hypertension of Syphilitic Origin: Cure by Specific Treatment. J. Dereux, L. Coustenoble and S. Desreumaux.—p. 1426.
*Acriflavine in Treatment of Cerebrospinal Meningitis. R. Puig.—p. 1429.

Cardiovascular Disturbances in Myxedema.—Froment and Jeune report three cases which throw light on the principal aspects of the cardiovascular disturbances for which myxedema is responsible. First they give their attention to cardiac hypertrophy in patients with myxedema (myocardiac myxedema). They cite the clinical history of a woman who developed cardiac hypertrophy and the typical signs of myxedema following a hemithyroidectomy. The patient was treated with thyroxine and under the influence of this treatment the myxedema as well as the cardiac enlargement disappeared. The authors point out that such cases are not unusual but that among seventy-two patients with myxedema in whom cardiac measurements were made fifty-two were found in whom the transverse diameter of the heart was above the normal maximum. As the characteristic aspects of the cardiac hypertrophies for which myxedema is responsible the authors list (1) the development in the course of myxedema and the parallelism between the degree of myxedema and the augmentation of the cardiac volume, (2) the elective therapeutic action of thyroid extracts, (3) the remarkable moderation of the signs of cardiac insufficiency in comparison with the considerable augmentation in the cardiac dimensions, (4) the electrocardiographic aspects which reveal an extremely low voltage of the electric complexes and a veritable disappearance of the T wave and (5) the inertia of the heart indicated by the feeble amplitude of the contractions. The authors further discuss, on the basis of another case history, the low voltage of the electric complexes in myxedema and then give their attention to angina pectoris and myxedema. Following a brief review of the literature they report the history of a man who for a while had been subject to attacks of angina pectoris. Hypertension without albuminuria had been observed during the same period. After two years of treatment with vasodilating measures the angina pectoris gradually improved, but signs of myxedema developed. When attempts were made to counteract the symptoms of myxedema by means of thyroxine there was a recurrence of attacks of angina pectoris. Other cardiovascular disturbances that may occur in patients with myxedema are cardiac insufficiency, disturbances in the cardiac rhythm, arterial hypertension and atheromatous lesions of the arteries. The value of total thyroidectomy in cardiac disorders is discussed.

Acriflavine in Treatment of Cerebrospinal Meningitis.—Puig reports the history of a child, aged 8, who was first subjected to intramuscular and intraspinal injections of polyvalent antimeningococcic serum. When after weeks this serotherapy proved ineffective, an intraspinal injection of 7 cc. of a 1:20,000 solution of acriflavine was administered and from this day on the child was given at first every day and then every second day intravenous injections of a 5:1,000 solution of acriflavine. Under the influence of this treatment the child recovered, and the author suggests that acriflavine might have a similar effect on meningococci as on gonococci. He directs attention to the fact that the intraspinal injection of acriflavine is accompanied by violent burning sensations in the region of the buttocks, the anus and the legs but that these last for only a minute or two and there are no other complications.

Mémoires de L'Académie de Chirurgie, Paris

63: 1247-1278 (Nov. 24) 1937. Partial Index

Ascending Angiocholitis After Hepaticogastrostomy: Its Exclusion by Operation of Mallet-Guy (Pyloric Exclusion). G. Leclerc.—p. 1265.
*Suture of Abdominal Wall with Aid of Buried Steel Wires. C. Dambrin.—p. 1269.

Suture of Abdominal Wall with Buried Wires.—Dambrin shows the advantages of the use of steel wire for ligating the abdominal wall, which the author commenced to

employ thirty-two years ago. Like Jeannel, the author employs a wire about 0.3 mm. in diameter; if it were finer, it would injure the tissues; if stronger, it would be difficult to tie. The technic is simple. In describing the suture of the wall after a subumbilical laparotomy, the author says that he closes the surgical opening in two layers; the deeper one with steel wire comprises the peritoneum and the muscular aponeurosis, and the upper, cutaneous one, is closed with clips, which can be removed on the seventh day. The buried steel suture is never the originating point of pain. In extremely emaciated patients the steel knots may be slightly perceptible under the skin, but this is not disagreeable for the patient. The wire is never eliminated if it has been well sterilized. In exceptional cases a suppurating hematoma may form and it may be necessary to extract one or two wires, but after that cicatrization is completed. The author used the buried wire suture also in hysterectomies for cancer of the uterus or for adnexitis. He emphasizes that the buried wire sutures are well tolerated.

Schweizerische medizinische Wochenschrift Basel

67: 1105-1124 (Nov. 20) 1937

*Infantile Paralysis Without Paralysis: Abortive Form of Meningitic Poliomyelitis. E. Wieland.—p. 1105.
Analeptica and Sport. R. Staehelin.—p. 1113.
Ganglions of Menisci. R. Meyer-Wildisen.—p. 1114.

Abortive Form of Meningitic Poliomyelitis.—Wieland reports that local epidemics of poliomyelitis developed in different parts of Switzerland between the early summer and November of the year 1936. In all, 1,270 cases were reported by physicians. The clinical and epidemiologic behavior varied greatly, but on the whole the course was unusually benign. In the children's clinic in Basel twenty-six cases of poliomyelitis were treated and there was not a single fatality. Nineteen of the cases were hospitalized between the second and fifth days of the disease, with high fever and with the symptoms of the so-called meningitic form of poliomyelitis. All these patients recovered completely without developing paralytic symptoms in the course of several weeks. However, all patients passed through a more or less severe muscular weakness, which was preceded by anomalies in the reflexes. Such cases of "infantile paralysis without paralysis" or of the abortive form of the so-called meningeal type of poliomyelitis have been described before, to be sure, sometimes under the misleading term of aseptic serous meningitis. The author points out that these cases seem to be everyhere on the increase and thinks that they indicate that the character of the epidemics of poliomyelitis becomes milder. Whether certain noncharacteristic, febrile infections without signs of nervous irritation, which develop in persons who come in contact with poliomyelitic patients (so-called contact cases), belong to the sphere of abortive poliomyelitis has not been definitely decided as yet. It is likewise difficult to estimate whether the surprisingly favorable therapeutic results are due to the benign character of the disease or to the early treatment with convalescent serum, parent's blood and large doses of sodium salicylate. Observations on cases in which the treatment was begun later seem to indicate that both the benign character of the disease and the early onset of the serotherapy were the cause of the favorable results. Regarding the control of poliomyelitis epidemics the author says that, in addition to early therapy and isolation of the patient, it is important to watch the healthy members of the patient's family, for the virus seems to be transmitted less often by direct contact than by indirect contact through healthy intermediate carriers to susceptible young persons.

Folia Medica, Naples

23: 1095-1150 (Oct. 30) 1937

*Alterations of Medullary and Peripheral Blood in Chronic Nephritis. A. M. Michelazzi and S. De Renzi.—p. 1097.
Treatment of Paroxysmal Tachycardia with Quinine and Analeptics by Intravenous Route. A. Francaviglia.—p. 1116.
Action of Vitamin E and of Liver Hormone on Hemopoietic Changes Induced in Rabbits by Acetanilid and Neutral Lead Acetate. C. Colella.—p. 1124.

Alterations of Blood in Chronic Nephritis.—Michelazzi and De Renzi studied the morphology and hemocytometry of the peripheral and medullary blood of nineteen patients who were suffering from glomerulitis in different stages of evolution. The medullary blood was taken by puncture of the sternum. The authors found that in all cases there is anemia of the hypochromic type, alteration of the chemical and physical properties of the blood, diminished size of the erythrocytes of the peripheral and medullary blood and hypoplasia of the bone marrow for all the blood-forming cells, especially erythrocytes. Anemia parallels the intensity of renal insufficiency and the alterations of the chemistry of the blood. Microcytosis depends on erythropoietic malformations and on the incapacity of the cells to regenerate owing to the presence of chemical and physical alterations of the blood. Hypoplasia of the bone marrow depends on the inhibition of erythropoiesis due to the presence of aromatic and toxic substances in the blood. The more intense the renal insufficiency, the greater the accumulation of toxic substances in the blood and the consequent inhibition of erythropoiesis. The alterations of the bone marrow as well as the modifications in the size of the diameters of the erythrocytes are characteristic changes of chronic nephritis.

Policlinico, Rome

44: 533-592 (Nov. 1, 1937) Medical Section

*Roentgen Calculations of Volume of Sella Turcica. G. Meldolesi and E. Pansadoro.—p. 533.
Aromatic Substances in Nephropathies. L. Supino.—p. 546.
Oxygen Therapy: Influence on Basal Metabolism and Erythropoiesis. Sellina Gualco.—p. 577.

Roentgen Method of Calculating Volume of Sella Turcica.—Meldolesi and Pansadoro report a roentgen method for determining the capacity of the sella turcica in living persons. The capacity of the sella equals the product of the multiplication of the figures of the lateral surface of the sella by those of the transverse diameter. The lateral surface is determined by Haas's method in the laterolateral projection. The transverse diameter is the length of a horizontal line at the base of the quadrilateral portion of the sphenoids which forms the back of the sella. It is determined in the sagittal position with a particular incidence. The authors use an adjustable tube in relation to the forward inclination of the patient's head with the patient seated. The roentgenograms are taken at a focal distance of 2 meters. They show the shadow of the back of the sella turcica directly projecting through the occipital foramen, on a space between the posterior margin of the occipital foramen and the arch of the first cervical vertebra. The authors made determinations in twenty-five living persons of both sexes, at different ages, and verifications of their studies on fourteen skulls. The volume of the normal sella turcica varies from 800 to 1,250 cu. mm. for adults and from 500 to 800 cu. mm. for children between 9 and 12 years of age. The figures of the transverse diameter of the normal sella compensate those which are given by the anteroposterior and vertical diameters of the sella turcica when the latter figures are diminished, in comparison with those regarded as normal. The figures for the volume obtained by x-ray measurements on the skulls closely agree with those obtained in living persons. The x-ray measurements give a difference of 10 or 15 per cent loss in square millimeters in comparison to the real measurements of the sella turcica. This was verified by direct measurements on paraffin copies of the sella turcica. Owing to the natural structure of the sella turcica, the method is not of mathematical exactness since the concavities in the sella appear as surfaces in the roentgenograms. It cannot be applied to measuring sella turcicas of abnormal contours. The evaluation of the sella turcica by the volumetric method gives more exact figures than those given by the measures of the sellar surface alone or by those of the sellar diameters.

Riforma Medica, Naples

53: 1541-1580 (Oct. 30) 1937

Syndromes of Hyperfunction of Liver. N. Pende.—p. 1543.
*Dehydrogenation Power of Leukemic Leukocytes for Fatty Acids. G. Bossa.—p. 1545.
Pinkus' Exudative Lymphatic Erythrodermia. C. Maderna.—p. 1549.

Dehydrogenation Power of Leukemic Leukocytes for Fatty Acids.—According to Bossa the leukocytes in leukemia have powers of dehydrogenation for fatty acids and produce keto acids. Homogeneous suspensions of leukemic leukocytes in the presence of Quastel's sodium glycerophosphate solution

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of fatty acids consume more oxygen and produce a larger quantity of acetic acid than the same suspensions which do not have any fatty acids. The most intense dehydrogenation takes place for the crotonic and palmitic acids. The largest production of acetic acid by the leukocytes takes place in the presence of crotonic acid. Leukemic lymphocytes have greater dehydrogenation and acetic acid-forming properties than leukemic myelocytes. The last mentioned properties of the leukocytes are the same in chronic and subacute forms of leukemia. The production of acetic acid is not proportional to the quantity of oxygen consumed in the reaction. It is possible that the ketonic acid, as it is produced in the reaction, transforms itself through reduction into hydroxybutyric acid or through oxidation into terminal products. Fatty acids may also diminish in the reaction through transformation of monobasic into dibasic acids by processes of oxidation of the terminal methyls, according to Verkade's ω oxidation.

Archiv für Gynäkologie, Berlin

165: 1-134 (Oct. 20) 1937. Partial Index

Neurohormone Regulation of Renal Function During Pregnancy as Demonstrated in Water Test. G. Effkemann.—p. 1.
Experimental Studies on Physiology and Pharmacodynamics of Uterine Tubes. C. Cella and I. D. Georgescu.—p. 36.
Peculiar Changes on Vessels of Umbilical Cord. W. Rust.—p. 58.
*Vitamin C Tolerance Tests in Nursing Puerperal Women. G. Gaehtgens and E. Werner.—p. 63.
Clinical Significance of Cranial Fractures in the New-Born. J. Erbslöh.—p. 76.
Duration of Birth and Its Dependence on Climatic and Geographic Influences. K. Nordmeyer.—p. 95.

Vitamin C Tolerance Tests in Nursing Mothers.—Gaehtgens and Werner made tolerance tests with cevitamic acid on nursing puerperal women. They studied the vitamin C content of the milk and determined the existing vitamin C deficit. The milk of a high percentage of the nursing mothers had a vitamin C content that was inadequate for the requirements of the nursling. The authors detected a dependence of the cevitamic acid content of the mother's milk on the quantity of cevitamic acid that was given in addition to the food. The oral administration of 100 mg. of cevitamic acid increased the vitamin C content of the milk in only a small percentage of cases. However, the intravenous administration of 300 mg. of the vitamin provided an adequate elimination of cevitamic acid in the breast milk. The authors discuss the significance of these observations for early lactation and for adequate provision of the nursling with vitamin C.

Zeitschrift für Kinderheilkunde, Berlin

59: 129-248 (Oct. 14) 1937. Partial Index

*Interposition of Colon: Abdominal Pains During Childhood. A. Windorfer.—p. 129.
Contribution to Problem on Food Requirements of Premature Births. Josefine Tanz and Helene Unger.—p. 135.
Aspects of Acute Erythremic Myelosis of Nursling Age (a Typical Erythroblastic Disease). F. Tecilazic.—p. 141.
*Behavior of Phosphorus Fractions of Erythrocytes in Anemia. Barbara Kinzel.—p. 160.
Malaria Treatment of Progressive Muscular Dystrophy. A. Meier.—p. 174.
Inflammatory, Nondiphtheritic Stenoses of Trachea and Bronchi. H. Braulke.—p. 181.
Sporadic Case of Severe Anemia in the New-Born After Preceding Severe Icterus. K. Debler.—p. 198.

Interposition of Colon During Childhood.—Windorfer points out that interposition of the colon has been repeatedly observed in adults but has not received attention in the pediatric literature. He demonstrates that this disorder has theoretical and practical interest during childhood. The disorder consists in a misplacement of the colon between the liver and the diaphragm. The case reported concerns a girl, aged 8. The child was subjected to a pulmonary roentgenoscopy because a tuberculin test had been positive. The child had been unsuccessfully treated for abdominal pains, which dated back more than four years. The first roentgenogram of the lung disclosed an accumulation of air under the right diaphragmatic arch. Repeated roentgenography revealed that this air space was comparatively large. The hepatic resistance could not be felt on palpation. Roentgenography following a contrast meal finally disclosed the interposition of the colon between the liver and the diaphragm. It was decided that this condition was responsible for the abdominal pains, from which the child had suffered for years. In the differential diagnosis of this disorder, conditions like umbilical colic, appendicitis, helminthiasis and ileus have to be considered. The treatment is rather unsatisfactory. The acute attack requires the use of spasmolytics and heat. Aside from restricting bloating foods and those with large amounts of cellulose, dietetic measures are unnecessary. The muscles, particularly those of the abdomen and the back, should be strengthened by suitable gymnastics.

Phosphorus Fractions of Erythrocytes During Anemia.—Kinzel says that, in view of the fact that erythrocytes contain phosphate esters, it seemed advisable to study their behavior in anemias. She summarizes as follows: 1. In anemias produced by venesection in rabbits, the anorganic and the esterized phosphorus in the blood as well as the esterized phosphorus in the erythrocytes decrease parallel with the hemoglobin and erythrocyte values. 2. In animals in which anemia was induced by the intravenous injection of phenylhydrazine, the esterized phosphorus of the erythrocytes showed in two out of three cases a behavior that was opposite to that of the hemoglobin and the erythrocytes; as these values decreased, the esterized phosphorus increased. Hydrolysis revealed in these two animals an increase of the hexosephosphate and of the glycerophosphate fractions of the entire acid-soluble phosphorus in the blood. In both animals a reticulolocytic crisis developed as an indication of a beginning cure, in spite of further measures to increase the anemia. The esterized phosphorus of the erythrocytes revealed a tendency to increase, together with the onset of the regeneration. 3. Observations on anemic children revealed that the esterized phosphorus in the whole blood decreases as the anemia increases, whereas the behavior of the anorganic phosphorus seems to follow no definite rules. However, the esterized phosphorus in the erythrocytes increased as the anemia advanced. In accordance with the depot theory, the decrease in the esterized phosphorus of the blood is thereby restricted. 4. As the esterized phosphorus of the erythrocytes increases, the phosphoric acid esters that are difficult to hydrolyze, the glycerophosphate and the hexosephosphate, increase in relation to the volume of the erythrocytes. This increase involves both fractions with changing severity. 5. The readily hydrolyzable phosphoric acid ester, the pyrophosphate, decreases relatively as well as absolutely as the esterized phosphorus in the erythrocytes increases. 6. Studies on the anemic children did not disclose a relation of the fluctuations in the esterized phosphorus to those in the reticulocytes. It therefore remains an open question whether, as was indicated by the animal experiments, the increase in the esterized phosphate is a phenomenon of regeneration.

Zeitschrift für Tuberkulose, Leipzig

78: 305-426 (Sept.) 1937. Partial Index

Open Treatment of Tuberculous Cavity. H. Kleesattel.—p. 305.
*Tuberculous Pachymeningitis. O. Koch.—p. 318.
Technic of Filling of Upper Lobe and of Plastic Operation on Upper Lobe. W. Kremer.—p. 331.
*Silent Superinfection in Tuberculosis. G. Weber and F. Dusch.—p. 336.
Perforation of Paravertebral Abscess into Lung. H. Poindecker.—p. 353.

Tuberculous Pachymeningitis.—Koch cites reports from the literature which indicate that tuberculous pachymeningitis is an accompanying process of the tuberculosis of adjoining organs and develops by contact. However, he observed still other forms of pachymeningitis. In this paper he gives his attention chiefly to the relations between tuberculous leptomeningitis and tuberculosis of the brain on the one hand and tuberculous inflammation of the dura on the other. There is reason to assume that tuberculosis of the pachymeninx may develop after that of the leptomeninges, simultaneously with it and even before. That is, there is an independent, hematogenically metastasizing, tuberculous process of the dura mater. The author differentiates three types: First he mentions the internal tuberculous pachymeningitis, which develops by contact infection. He points out that the most frequent form of this type, the fine nodules that accompany tuberculous leptomeningitis, has been described before, particularly by Huebschmann,

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who emphasizes that this form of nodular tuberculosis of the dura is not found in all cases of tuberculous leptomeningitis. It is often absent in new tuberculous basal meningitis. To be sure, it is difficult to say in what stage of advancement the leptomeningitis must be in order to produce an infection in the dura. In the second type of tuberculous pachymeningitis which the author observed the dependence on tuberculous processes of the leptomeninges is possible but not proved. In discussing this type, he gives three case reports. In two of the cases there existed, in addition to the changes in the dura, also numerous solitary tubercles of the brain, but in the third case they were absent. The third type of tuberculosis of the dura which the author describes is the independent hematogenic metastasis. In one of the case histories which he cites in connection with this type, the brain could be lifted from the two large tubercles of the dura without loss of substance. The corresponding portions of the brain showed depressions that were entirely smooth and were still covered with the pia mater. Thus it cannot be said that the tuberculomas had been torn from the brain and only adhered to the dura. To be sure, there also existed a tubercle in the substance of the brain, but this was nowhere in contact with the surface, so that it could not elicit an infection of the dura and of the leptomeninges. Consequently the author regards the tuberculomas of the dura as independent hematogenic metastases caused by the same dissemination as the tubercle in the brain itself. He further cites a case in which there existed a tubercle only of the dura, all other parts of the brain being entirely free from tuberculosis. Finally the author cites a form of tuberculosis of the meninges that developed in the course of a primary tuberculosis of a child. In this case the microscopic examination disclosed extensive changes in all layers of the dura and also in the leptomeninges.

Silent Superinfection in Tuberculosis. — Weber and Dusch point out that the influence of tuberculous superinfection is still rather obscure. It is almost impossible to determine whether a newly developing tuberculous focus is the result of a superinfection or of an endogenous metastatization. In experiments on guinea pigs he made the following observations: 1. The subcutaneous infection with a human strain of tubercle bacillus of weak virulence produces an isolated primary complex without generalization. 2. The intracutaneous infection with from fifty to 100 bacilli of a virulent bovine strain produces a large tuberculous primary focus, a severe caseation of the regional lymph nodes as well as an extensive generalization in the internal organs. 3. Animals that were given a preliminary treatment with one strain of tubercle bacilli and then were superinfected with another strain showed no macroscopically demonstrable changes at the site of superinfection. Nevertheless, microscopic examination always disclosed characteristic changes at this site. Following a review of the observations made by other investigators, the author shows that superinfection often gives at first the impression of an isolated involvement of the lymph glands. Since the site of superinfection frequently remains unrecognized, the condition is referred to as "silent superinfection." Further the author compares the results of the experimental studies with the natural infection in human subjects and reaches the conclusion that the two are in accord. He thinks that the results of a superinfection are chiefly tuberculosis of the bronchial lymph nodes and its sequels, perihilar infiltrations and hematogenic disseminations. He emphasizes that the animal experiments as well as the clinical observations demonstrate that it is absolutely necessary to protect tuberculous children, particularly nurslings and small children, against a superinfection.

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Wiener klinische Wochenschrift, Vienna

50: 1539-1570 (Nov. 12) 1937. Partial Index

Artificially Produced Cutaneous Tuberculosis in Treatment of Severe Pulmonary Tuberculosis. H. Kutschera-Aichbergen: C'td.—p. 1544.
*Henry's Malaria Reaction and Its Relation to Complement Titer and to Takata Reaction. W. Volavsek.—p. 1551.
*Experiences with Radium Therapy in Bleeding Myomas. O. Bittmann. —p. 1552.

Relations Between Henry's Malaria Test, Complement Titer and Takata Reaction.—Volavsek studied the behavior of Henry's test on male and female patients who received malarial treatment for gonorrhea. Control tests were made on disorders such as dermatoses, gonorrhea, syphilis, chancroid tuberculosis, arthritides, pneumonia, carcinoma, hepatic diseases and so on. In summarizing his experiences he says that Henry's malaria reaction always becomes positive in the course of a vaccination malaria. It becomes positive at the earliest after the third and at the latest after the sixth attack. The control tests revealed nonspecific positive reactions in disorders with impairment of the hepatic parenchyma and in tuberculosis, carcinoma and syphilis. In the patients undergoing malaria therapy and in whom Henry's reaction was strongly positive, the complement reaction and the Takata reaction gave positive results. The author concludes that an increase in the instability of the serum is of decisive influence for the positive outcome of Henry's reaction.

Radium Therapy for Bleeding Myomas. — Bittmann reports experiences with radium irradiation in sixty-four cases of uterine myoma that were complicated by severe hemorrhages. In thirty-five of the cases only curettage had preceded the application of radium. The curettage was done for diagnostic purposes. Some of the women had been treated previously by organotherapy, balneotherapy or other measures. After classifying the cases according to the size of the myomas, the author discusses the dosage. He says that in two cases of large myomas he applied 2,800 millicurie hours but admits that the result was disappointing. He reaches the conclusion that large myomas are not suitable for radium therapy. However, in surveying the results of radium therapy in fifty-nine patients with smaller myomas, he finds that they are surprisingly favorable. He stresses as an advantage of intra-uterine radium therapy the prompt cessation of the hemorrhage as the result of the direct ray action. A disadvantage is that the intra-uterine radium therapy cannot be used in case of large myomas, of submucous myomas or of the large intramural myomas. In the submucous myomas there is danger of necrosis and in the presence of the large intramural myomas a homogeneous irradiation of the uterine cavity is impossible. He concludes that intra-uterine radium therapy should be resorted to in those cases of bleeding myomas in which a considerable anemia exists but in which the growths are at the most the size of a goose egg. Moreover, only women who are past the menopause or at least near it should be subjected to this treatment.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

81: 5583-5658 (Nov. 20) 1937. Partial Index

Pseudosyphilis Papulosa Lipschütz and Posterosive Syphiloid (Jacquet). W. L. L. Carol.—p. 5586.
*Is There a Tropical Syphilis? C. W. Bottema.—p. 5593.
Syndromes of Still, Chauffard-Ramond and Felty. T. F. Bloem, S. Van Creveld, F. C. Kuipers and P. J. Zuidema.—p. 5601.
*Tryptophan Reaction in Cerebrospinal Fluid. W. A. Griep.—p. 5612.

Is There a Tropical Syphilis?—Bottema presents a comparison that was made between 321 cases of recent syphilis in Asiatic and 770 cases in European subjects, all military men of the Netherlands royal navy, all well cared for and well nourished and not in a position to conceal their disease to any appreciable extent. This investigation and a study of the literature of the last five years led to the following conclusions: 1. Primary and secondary syphilis in Europeans and Asiatics run an analogous course. 2. Congenital and the other forms of syphilis occur in Asiatics as well as in Europeans. 3. As concerns the ethnologic groups of the East Indian Archipelago, racial factors exert no influence worth mentioning on the course of syphilis. 4. The picture, which till the present was designated as "tropical syphilis," can be explained on the basis of one or more of the following factors, which have nothing to do directly with syphilis or with race: (1) confusion between yaws and syphilis, (2) conclusions drawn from observing a one-sided material of native patients attending the dispensaries of the Western pattern, which conclusions do not hold for the total population, (3) the result of neglect, lack of care and of efficient treatment and (4) the influence of a poor general physical condition, no matter of what cause.

Tryptophan Reaction in Cerebrospinal Fluid.—Griep points out that in 1932 Lichtenberg suggested a color reaction with tryptophan as a diagnostic test for tuberculous meningitis. He mentions other authors who employed this test and then describes his own experiences with the method. He made the

test on the cerebrospinal fluid of fifty patients with various disorders and found that the tryptophan color reaction is always positive when the protein reactions are positive. He says that the reaction cannot be considered a specific test for tuberculous meningitis.

Norsk Magasin for Lægevidenskapen, Oslo

98: 561-897 (June) 1937. Partial Index

*Fifty Cesarean Sections in Placenta Praevia. L. S. Petersen.—p. 600.
Pathogenesis of Gastric Ulcer: Surgeon's Experiences. N. Paus.—p. 623.
Surgical Treatment of Bronchial Asthma: Extirpation of Stellate Ganglion. R. Ingebrigtsen.—p. 638.
*Total Gastrectomy with Esophagojejunostomy: Seven Cases. J. Holst.—p. 672.
*Investigations on Etiology of Lymphogranulomatosis, Especially Relation Between Lymphogranulomatosis and Tuberculosis. G. Lützow-Holm.—p. 695.
*Primary Cavernous Hemangioma in Parotid Gland. G. Guldberg.—p. 756.
*Cancer of Vater's Papilla: Review of Material of Cases of Cancer of Vater's Papilla from Rikshospital's Pathologic-Anatomic Institute from 1900 to 1936; Experiences from Cases of Cancer of Vater's Papilla in Which Radical Operation was Performed. F. Roscher.—p. 777.
*Tumors Originating from Carotid Glands. R. Strøm.—p. 845.

Cesarean Section in Placenta Praevia.—Petersen states that the results of fifty cesarean sections in placenta praevia at the Women's Clinic in Bergen show that the procedure is superior to other forms of treatment in saving the life of the fetus and does not expose the mother to greater risks. With expectant treatment, 17 per cent of the children died; after bringing down a foot, 75 per cent, and after cesarean section, 4 per cent. Three fourths of the children who survived after cesarean section were practically at full term, while only one of seven who were alive after bringing down a foot was at full term. Cesarean section is recommended in cases of placenta praevia when grave bleeding is present or threatens. If the hemorrhage does not seem grave, expectant treatment is in order, eventually with rupture of the membrane. If the hemorrhage is grave and the mouth of the uterus closed, cesarean section is indicated. If the mouth of the uterus is open to two or three fingers, cesarean section competes with bringing down of a foot and pulling on it; if the child is dead or not viable, the hemorrhage can be stilled as effectively by this method and, if the child is living and viable, cesarean section is done even with open mouth of the uterus. In cases of infection or of preceding intravaginal or intrauterine intervention, cesarean section must often be avoided even if the child is viable.

Total Gastrectomy with Esophagojejunostomy.—Holst's seven patients had roentgenologically established tumor tissue practically from the cardia to the esophagus, in some cases to a considerable degree adherent to the surrounding tissue. Six of the patients had cancer and one a general polyposis of the stomach with profuse bleeding. In two cases spinal anesthesia was used; in three, ether; in two, combined ether and spinal anesthesia. With general anesthesia Trendelenburg's position is advised. The abdominal wall was opened by a left-sided diarectal incision carried upward 3 cm. above the costal arch. The esophagojejunostomy was an end to side anastomosis. The suture line was covered with parietal peritoneum from the diaphragm, which was affixed to the jejunal suture line with silk-knot sutures. Two and a half years after the operation the patient with polyposis has gained 8 Kg., is in good condition and can work; one of the cancer patients is living after fifteen months and has gained 10 Kg. Neither has developed anemia, although no antianemia medication is used. One patient died postoperatively, one a year after operation from metastases, and four died from four to six months after operation from metastases or recurrence. The nutrition absorption of the intestinal canal was only slightly affected after gastrectomy.

Lymphogranulomatosis and Tuberculosis.—Lützow-Holm reports eighteen cases of lymphogranulomatosis and asserts that the study of specimens from these patients by systematic inoculation in guinea pigs and attempted cultivation and establishment of tubercle bacilli testify against the tuberculous origin of lymphogranulomatosis. The frequent coincidence of the two disorders mentioned by some authors was not present in his material, only one case showing simultaneous tuberculosis. He attributes the tuberculosis, which in some cases is produced in guinea pigs by inoculation with lymphogranulomatosis, to a secondary deposit of tubercle bacilli in the lymphogranulomatous tissue and considers it possible that a secondary invasion of this kind may explain the "positive" inoculations elsewhere. He concludes that lymphogranulomatosis and tuberculosis are no more related to each other than are, for instance, leukemia and tuberculosis.

Primary Cavernous Hemangioma in Parotid Gland.—Guldberg says that only four cases of this disorder have been reported. In his case the tumor, in the left parotid gland, was visible when his patient was 3 months old and grew rapidly during the first months, then slowly. Attempted surgical removal when the patient was 40 months old was unsuccessful because the tumor adhered to adjacent tissue. Three roentgen treatments resulted in its disappearance, and one year after treatment ended there is no recurrence. Microscopically there was the typical picture of a primary cavernous parotid hemangioma, interspersed with islands of parotid tissue with atrophic changes. The angioma tissue represented all stages of development and all transitions from compact areas with newly formed vessels (some of which might be mistaken for hypertrophic parotid tissue) to distended blood-filled cavernous vessels with projecting septums, the so-called spur formation.

Cancer of Papilla of Vater.—In 8,724 necropsies there were forty-nine cases of cancer in the bile ducts, in five of which the cancer developed from Vater's papilla or its immediate neighborhood. In the case described, in a man aged 55, duodenopancreatectomy was done. Roscher says that in the first session cholecystogastrostomy was carried out, after which the jaundice which had been present for a long time disappeared. Two months later, when the patient's condition had improved considerably, resection of the duodenum and the head of the pancreas was performed, with ligation of the ductus choledochus, implantation of the pancreatic duct in the jejunum and retrocolic gastro-enterostomy of the greater curvature. The operation and after-treatment were uneventful and the patient's condition greatly improved. He died five months later from bronchopneumonia, after having for some time had pain in his chest and a cough, probably due to metastases.

Tumors Originating from Carotid Glands.—Strøm reports two cases of tumor in the carotid glands, a disorder which, he says, has not previously been described in Norwegian literature, in women aged 45 and 29. The tumors, which were wholly resistant to radiation therapy, were of typical alveolar, "glomus-like" structure with benign clinical course. Seven years and one year, respectively, after radical surgical removal the patients are well, but have postoperative defects; in the first case a complete unilateral peripheral hypoglossal injury, in the second, similar hypoglossal injury and symptoms in the upper right extremity of a left-sided brain mollition, due to ligation of the common carotid artery. The author says that about 250 cases of these predominatingly benign tumors in the neck have been reported. In surgical treatment the mortality is from 25 to 30 per cent, the postoperative morbidity about 50 per cent and often of a lasting kind. The most dangerous complications are mollition of the brain and pneumonia after injury of the vagus, each one of which caused death in from 10 to 15 per cent of all cases in which operation was performed. Postoperative lesions of the sympathetic, hypoglossal and recurrent nerves also are frequent. Improvement on the results of treatment depends on a better preoperative diagnosis of the exact location of the tumor and of the conditions of circulation in the carotid artery. By roentgenologic arteriography and by test compression of the common carotid artery the possibility of radical operation with ligation of the carotid without danger of mollition of the brain can be determined. If the test compression is not well borne, prolonged intermittent preoperative compression treatment must be instituted to develop the collateral circulation, which alone can protect the brain from deleterious effects of ligation of the carotid. Radical removal of every carotid tumor as early as possible is called for, before further growth leads to complications from the nerves of the brain.

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